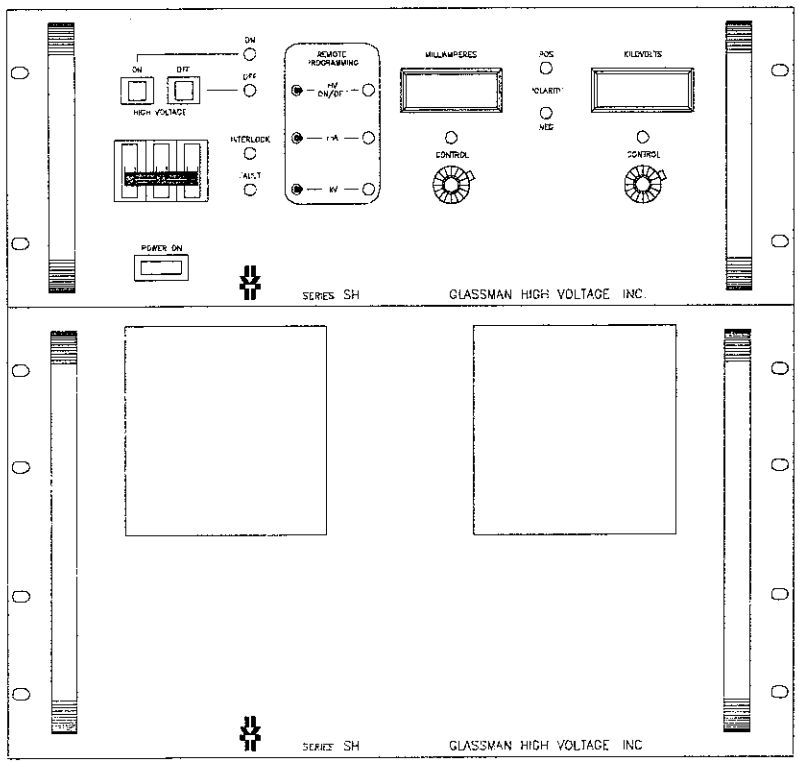
INSTRUCTION MANUAL

SH SERIES

SERIAL #: **N144732-01**

MODEL: **PS/SH001R16.0**

DATE: 2/14/06



Innovations in high voltage power supply technology

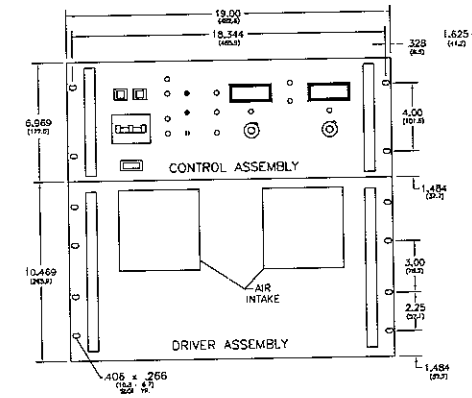
GLASSMAN HIGH VOLTAGE INC.

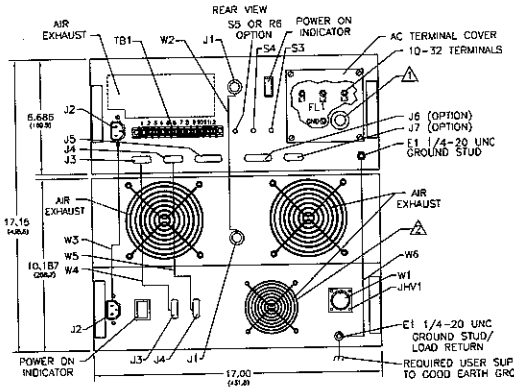
124 West Main Street P O Box 317

High Bridge N J. 08829

*(908) 638-3800 * FAX (908) 638-3700 * www GlassmanHV.com*

8 kW Models





CONTROL ASSEMBLY

J5 –
1 – V PROGRAM
2 – PROGRAM RETURN
3 – PROGRAM RETURN
4 – I PROGRAM
5 – +10V REFERENCE
6 – COMMON
7 – V MONITOR
8 – MONITOR RETURN
9 – MONITOR RETURN
10 – I MONITOR
11 – CONTROL STATUS (COM)
12 – I CONTROL STATUS (NO)
13 – V CONTROL STATUS (NC)
14 – HV STATUS (NC)
15 – HV STATUS (NO)
16 – HV STATUS (COM)
17 – +10V REFERENCE
18 – COMMON
19 – FAULT STATUS (NC)
20 – FAULT STATUS (NO)
21 – RESERVED
22 – TTL ENABLE
23 – FAULT STATUS (COM)
24 – GROUND
25 – GROUND

TB1 –
1 – GROUND
2 – COMMON
3 – INTERLOCK
4 – RESERVED
5 – RESERVED
6 – TTL ENABLE
7 – RESERVED
8 – RESERVED
9 – REMOTE HV OFF
10 – REMOTE HV OFF
11 – REMOTE HV ON
12 – REMOTE HV ON

J1 – DC POWER INTERFACE
J2 – AC POWER INTERFACE
J3 – INVERTER INTERFACE
J4 – HIGH VOLTAGE INTERFACE
E1 – GROUND STUD

FL1 – AC INPUT – 208 VAC +/- 10% 48-63 HZ 3 PHASE

S3 – TTL LOCAL/REMOTE
S4 – CURRENT LIMIT/TRIP

⚠1 – STRAIN RELIEF FOR .62" – .75" DIA. CORD OR INSULATED WIRE BUNDLE (SUPPLIED) PROPER INSULATION/STRAIN RELIEF MUST BE MAINTAINED THROUGH AC TERMINAL COVER FOR SAFE OPERATION!

⚠2 – FAN GUARD PROVIDED ON >6KV UNITS, AIR HOLES ON 1-6KV UNITS.

DRIVER ASSEMBLY

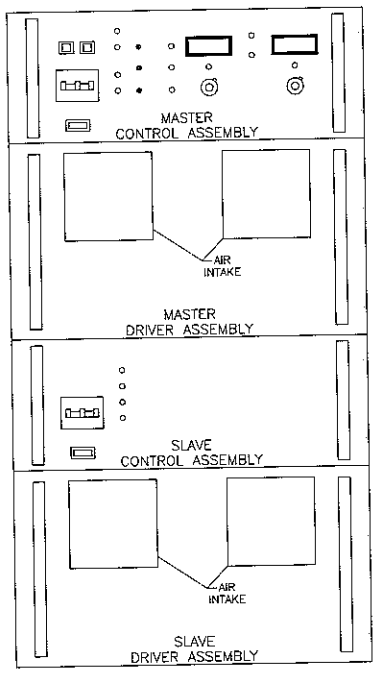
J1 – DC POWER INTERFACE
J2 – AC POWER INTERFACE
JHV1 – HIGH VOLTAGE OUTPUT CONNECTOR 1-60KV AMPHENOL 83-1R OR EQUIVALENT 70-100KV MS3102A-18 (SHOWN)
E1 – LOAD RETURN GROUND STUD
J3 – INVERTER INTERFACE
J4 – HIGH VOLTAGE INTERFACE

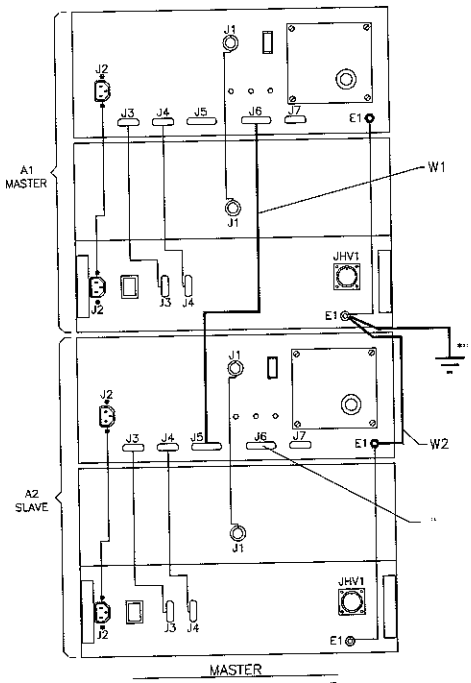
IN (MM)

NET WEIGHT: 110 lbs. 41 kg

16 kW Models

SEE MAIN OUTLINE DRAWING FOR ALL OTHER CONNECTIONS





NOTES

* – J6 OF SLAVE TO BE TERMINATED WITH CONNECTOR PROVIDED.

** – REQUIRED USER SUPPLIED CONNECTION TO GOOD EARTH GROUND.

MASTER
J6 – SLAVE INTERFACE OUTPUT

SLAVE
J5 – SLAVE INTERFACE INPUT

SH16KW.DWG

Designing Solutions for High Voltage Power Supply Applications

GLASSMAN HIGH VOLTAGE INC.

124 West Main Street, PO Box 317, High Bridge, NJ 08829-0317
(908) 638-3800 • Fax (908) 638-3700 • www.glassmanhv.com

Specifications

Specifications for 8 kW Power Supplies

(Specifications apply from 5% to 100% of rated voltage Operation is guaranteed down to zero with a slight degradation of performance)

(For 16 kW power supplies unless otherwise indicated the performance specification limits could be increased by a factor of up to 30% For power supplies over 16 kW consult the factory)

Input: 187-228 V rms three-phase 48-63 Hz 11,500 VA maximum at full load (less than 35 A per phase) Inrush current is less than 45 A with a nominal decay time constant of 60 ms Four 10-32 studs for AC line connection with a safety cover and strain relief are provided For systems 16 kW and greater a separate AC input connection is required for each additional slave chassis

Mains service must be protected with fuses or circuit breakers with a maximum rating of 125 A and a minimum interrupting capacity of 50 000 A.

Efficiency: Typically 85% at full load

Output: Continuous stable adjustment from 0 to rated voltage/current by means of panel-mounted 10-turn potentiometers (0 05% resolution), or external 0 to +10 V signals Repeatability better than 0 1% of setting

Voltage programming accuracy: 0 5% of setting + 0 2% of rated output

Resolution is a function of the programming method used

Voltage and current external programming are differentially coupled with a maximum common mode voltage of ±3 VDC

Voltage Regulation: Better than ±0 005% for specified line variations and 0 01% + 10 mV/A for no load to full load variations

Current Regulation: From short circuit to rated voltage at any load condition:

1 kV to 6 kV: Better than 0 5%
8 kV to 100 kV: Better than 0 2%

Voltage Monitor: 0 to +10 V equivalent to 0 to rated voltage Accuracy 0 5% of reading + 0 2% of rating Output impedance is 10 kΩ differentially coupled

Current Monitor: 0 to +10 V equivalent to 0 to rated current Accuracy:

1 kV to 6 kV: 1 5% of reading plus 0 5% of rated output
8 kV to 100 kV: 1% of reading plus 0 2% of rated output

Output impedance is 10 kΩ differentially coupled

Ripple: Better than 0 025% of rated voltage +1 V RMS at full load

Stored Energy See Models chart

Stability: 0 01% per hour after 1/2 hour warm-up 0 05% per 8 hours

Voltage Rise Time Constant: 200 ms for 8 kV to 100 kV models and 50 ms for 1 kV to 6 kV models typical using either HV enable or remote programming control

Voltage Decay time constant: Decay time constant is a function of the applied load The decay time constant will be equal to the rise time constant with a minimum load of 5% of rated maximum

Temperature Coefficient: 0 01%/° C

Ambient Temperature: -20 to +40° C operating; -40 to +85° C storage

Polarity: Available with either Positive Negative or Reversible polarity with respect to chassis ground

Protection: Automatic current regulation protects against all overloads including arcs and short circuits Thermal switches and rpm sensing fans protect against thermal overload Circuit breaker fuses surge-limiting resistors, and low energy components provide ultimate protection

Arc Quench Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc

Arc Sensing Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV Internal circuitry senses the number of arcs caused by external load discharges If the rate of consecutive arcs exceeds approximately one arc per second for five arcs the supply will turn off for approximately five seconds to allow clearance of the fault After this period the supply will return automatically to the programmed output voltage value with the voltage rise time constant indicated If the load fault still exists the above cycle will be repeated

Current Limit: In current limit mode the power supply will regulate the load current at the programmed current level with automatic crossover between voltage and current regulating modes

Current Trip: A switch located on the rear of the control panel assembly allows the selection of current limit or current trip operation When the switch is set to current trip mode the HV output will disable and latch off when the load current reaches the programmed current level. Reset is accomplished by either cycling the AC power toggling the HV enable signal or by pushing the HV off/reset and then the HV on switches

Front Panel Elements The front panel contains all local control functions and remote/local selector switches These control functions are: AC power on/off circuit breaker and indicator light separate 10-turn controls with locking vernier dials used to set voltage and current levels, high voltage on switch and high voltage off/reset switch LED s indicate: when high voltage is on output polarity interlock fault status and whether the supply is operating in a voltage or current regulating mode Output levels are indicated by voltage and current digital meters Remote/local switches are provided for voltage and current programming and HV on/off functions

Slave Front Panel Elements (When applicable) AC power breaker/switch and indicator Bias tracking (overvoltage) and thermal overload/low fan speed indicators Slave current and voltage service test points

Remote Control Interface All standard SH family power supplies provide a user s remote interface The signals provided are:

Inputs:

Safety interlock output voltage and current program signals high voltage enable and connections for remote HV on and off pushbuttons

Outputs:

Output voltage and current monitor signals, HV enable status I/V regulation mode status fault status and a +10 V reference source

Signal common and ground reference terminals are also provided

Toggle switches on the rear of the control chassis select either current limit or current trip operation and local or remote HV enable

External Interlock: Open = off closed = on Normally latching except for NC option supplies where it is non-latching The interlock indicator LED is lit when the interlock is open

HV Enable:

Remote Mode: 0 - 1 5 V = OFF; 2 5 - 15 V = ON

Local Mode: The HV output is permanently enabled

HV Enable Fault and I/V Regulation Status: Each are a set of form C relay contacts

Accessories: Detachable 8 foot shielded high voltage coaxial cable provided Models 16 kW and above are provided with an additional HV cable per slave module A 25 pin D-subminiature connector for customer interface is provided All chassis interconnection cables are provided

TABLE OF CONTENTS
SH SERIES

WARRANTY

Glassman High Voltage, Inc (Glassman) warrants standard power supplies it manufactures to be free from defect in materials and factory workmanship, and agrees to repair or replace any standard power supply that fails to perform as specified within three years after date of shipment OEM and modified standard power supplies are warranted, as stated above, for one year from date of shipment This Warranty shall not apply to any power supply that has been:

i) repaired, worked on or altered by persons unauthorized by Glassman in such a manner as to injure, in Glassman's sole judgment the performace stability or reliability of the power supply:
ii) subjected to misuse, negligence, or accident; or
iii) connected, installed, adjusted, or used otherwise than in accordance with instructions furnished by Glassman

Glassman reserves the right to make any changes in the design or construction of its power supply at any time without incurring any obligation to make any change whatever in units previously delivered.

Glassman's sole liabilities, and buyer's sole remedies. under this agreement shall be limited to a refund of the purchase price, or at Glassman's sole discretion, to the repair or replacement of any power supply that proves, to Glassman's satisfaction, to be defective when returned to the Glassman factory transportation prepaid by the buyer. within the warranty period Glassman shall in no way be liable for damages consequential or incidental to defects in any power supply for failure of delivery in whole or in part, for injuries resulting from its use or for any other cause

THIS WARRANTY IS EXCLUSIVE AND IS GIVEN AND ACCEPTED IN LIEU OF (1) ANY AND ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND (2) ANY OBLIGATION LIABILITY RIGHT, CLAIM OR REMEDY IN CONTRACT OR TORT

This Warranty and the writing attached constitute the full understanding of the manufacturer and buyer, and no terms, conditions, understanding, or agreement purporting to modify or vary the terms hereof shall be binding unless hereafter made in writing and signed by an authorized official of Glassman High Voltage Inc.

Rev 6/1/86

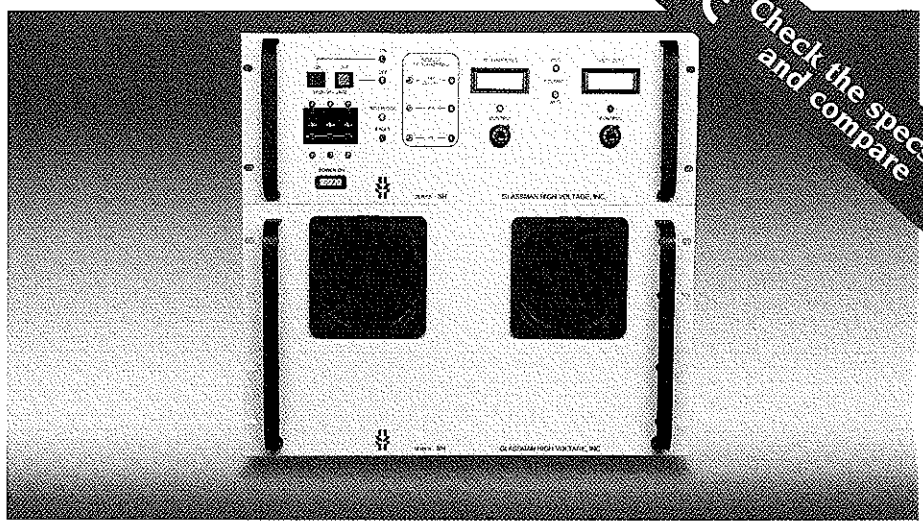
SH Series
8 kW to 40 kW Regulated High Voltage DC Power Supplies

1 kV to 100 kV Rack Mount

CE and Semi S2-93 Compliant

The SH family of power supplies are sophisticated 8 kW through 40 kW high voltage power supplies with low ripple and noise They are air insulated fast response units with tight regulation and extremely low arc discharge currents

Fully Compliant With The European harmonized EMI directive and with the low voltage directive 73/23/EEC



Models from 0 to 1 kV through 0 to 100 kV
8kW models are 17 5 H x 24 0' D Weight is only 110 lbs

Features:

Arc Quench The HV output is inhibited for a short period after each load arc to quickly extinguish the arc

Arc Sensing Internal circuitry constantly senses and integrates arcs that occur over a given time In the event a system or load arcing problem develops and exceeds factory-set parameters the power supply will cycle off in an attempt to clear the fault and then automatically restart after a preset off dwell time

Pulse-Width Modulation Off-the-line pulse-width modulation provides high efficiency and a reduced parts count for improved reliability

Air Insulated The SH Series features air as the primary dielectric medium No oil or encapsulation is used to impede serviceability or increase weight

Constant Voltage/Constant Current Operation Automatic crossover from constant-voltage to constant-current regulation provides protection against overloads arcs and short circuits

Current Trip This feature may be substituted for constant-current operation by a rear panel selector switch

Redundant Thermal Overload Protection Thermostats and tachometer fan RPM sensing shut down the power supply due to over temperature or reduced fan speeds

Low Ripple Typically ripple is less than 0 025% rms of rated voltage at full load

Tight Regulation Voltage regulation is typically better than 0 01% for allowable line and load variations Current regulation is better than 0 1% from short circuit to rated voltage

Higher Power Capability Power supply modules can be paralleled up to 40 kW output power utilizing one master control module and up to four slave modules

Differentially Coupled Analog Control Signals All voltage and current programming and monitoring signals are coupled to the user interface by true differential amplifiers This provides for the ability to return the program and monitor commons to ground or system common at the source This arrangement isolates the return wires and eliminates errors due to unwanted return currents flowing in these connections

Warranty Standard power supplies are warranted for three years; OEM and modified power supplies are warranted for one year A formal warranty statement is available

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Printed in the U S A C 9/8/2003

Options

Symbol	Description
ZR	Zero start interlock Voltage control local or remote must be at zero before HV will enable
SS	Slow start ramp Specify standard times of 5 10 15 20 or 30 seconds ± 20%
5VC	0-5 V voltage and current program/monitor
NC	Blank front panel Panel contains AC power breaker/switch and indicator HV ON HV OFF interlock and fault indicators and output current and voltage service test points
ARC	For 1 to 6 kV models Arc quench and arc sensing are provided as described in specifications for 8 to 100 kV models
GE9	RS-232 control and monitor

Please consult factory for special requirements

8 kW Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Output Cable
Reversible Polarity Only		SH1R8.0	0 – 1kV	0 – 8.0A	8	RG-8U
		SH1.5R5.3	0 – 1.5kV	0 – 5.3A	7.8	RG-8U
		SH2R4.0	0 – 2kV	0 – 4.0A	7.5	RG-8U
		SH3R2.7	0 – 3kV	0 – 2.7A	8	RG-8U
		SH5R1.6	0 – 5kV	0 – 1.6A	7	RG-8U
		SH6R1.3	0 – 6kV	0 – 1.3A	8	RG-8U
SH8P1.0	SH8N1.0	SH8R1.0	0 – 8kV	0 –1000mA	10	RG-8U
SH10P800	SH10N800	SH10R800	0 – 10kV	0 – 800mA	12	RG-8U
SH12P670	SH12N670	SH12R670	0 – 12kV	0 – 670mA	12	RG-8U
SH15P530	SH15N530	SH15R530	0 – 15kV	0 – 530mA	10	RG-8U
SH20P400	SH20N400	SH20R400	0 – 20kV	0 – 400mA	18	RG-8U
SH25P320	SH25N320	SH25R320	0 – 25kV	0 – 320mA	13	RG-8U
SH30P270	SH30N270	SH30R270	0 – 30kV	0 – 270mA	18	RG-8U
SH40P200	SH40N200	SH40R200	0 – 40kV	0 – 200mA	16	RG-8U
SH50P160	SH50N160	SH50R160	0 – 50kV	0 – 160mA	20	RG-8U
SH60P130	SH60N130	SH60R130	0 – 60kV	0 – 130mA	24	RG-8U
SH70P110	SH70N110	SH70R110	0 – 70kV	0 – 110mA	28	DS2121
SH80P100	SH80N100	SH80R100	0 – 80kV	0 – 100mA	32	DS2121
SH100P80	SH100N80	SH100R80	0 – 100kV	0 – 80mA	40	DS2121

16 kW Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Output Cable
Reversible Polarity Only		SH1R16.0	0 – 1kV	0 – 16.0A	16	2X RG-8U
		SH1.5R10.6	0 – 1.5kV	0 – 10.6A	15.6	2X RG-8U
		SH2R8.0	0 – 2kV	0 – 8.0A	15	2X RG-8U
		SH3R5.4	0 – 3kV	0 – 5.4A	16	2X RG-8U
		SH5R3.2	0 – 5kV	0 – 3.2A	14	2X RG-8U
		SH6R2.6	0 – 6kV	0 – 2.6A	16	2X RG-8U
SH8P2.0	SH8N2.0	SH8R2.0	0 – 8kV	0 – 2.0A	20	2X RG-8U
SH10P1.6	SH10N1.6	SH10R1.6	0 – 10kV	0 – 1.6A	24	2X RG-8U
SH12P1.3	SH12N1.3	SH12R1.3	0 – 12kV	0 – 1.3A	24	2X RG-8U
SH15P1.06	SH15N1.06	SH15R1.06	0 – 15kV	0 – 1060mA	20	2X RG-8U
SH20P800	SH20N800	SH20R800	0 – 20kV	0 – 800mA	36	2X RG-8U
SH25P640	SH25N640	SH25R640	0 – 25kV	0 – 640mA	26	2X RG-8U
SH30P540	SH30N540	SH30R540	0 – 30kV	0 – 540mA	36	2X RG-8U
SH40P400	SH40N400	SH40R400	0 – 40kV	0 – 400mA	32	2X RG-8U
SH50P320	SH50N320	SH50R320	0 – 50kV	0 – 320mA	40	2X RG-8U
SH60P260	SH60N260	SH60R260	0 – 60kV	0 – 260mA	48	2X RG-8U
SH70P220	SH70N220	SH70R220	0 – 70kV	0 – 220mA	56	2X DS2121
SH80P200	SH80N200	SH80R200	0 – 80kV	0 – 200mA	64	2X DS2121
SH100P160	SH100N160	SH100R160	0 – 100kV	0 – 160mA	80	2X DS2121

For Models Greater Than 16 kW, Please Consult Factory.

Declaration of Conformity

Declaration of Conformity
according to EMC Directive 89/336/EEC
and Low Voltage Directive 73/23/EEC

Manufacturers Name: Glassman High Voltage, Inc
Manufacturers Address: PO Box 317
124 West Main Street
High Bridge, NJ 08829-0317
USA

Manufacturer declares that the **SH Series** Power Supplies conform to the following Product Specifications:

EMC:

EN 55011 class A	EN 61000-4-2 - 4kV CD, 8kV AD
EN 61000-4-3 - 10V/m	ENV 50204 - 10V/m
EN 61000-4-6 - 10V RMS	EN 61000-4-4 - 1kV Signal Cable, 2kV AC Mains

LV Directive: EN 61010-1:
Environmental conditions:
Indoor use
Altitude up to 2000 meters
Temperature 5 deg C to 40 deg C
Humidity 80% maximum
Input Mains Fluctuations +/-10%
Installation Category II per IEC1010-1, paragraph 1 4 & annex J
Pollution Degree 2 per IEC1010-1, paragraph 3.7.3

Means Of Conformity:
The product herewith complies with the requirements of the EMC Directive 89/336/EEC based on the use of a Technical Construction File (TCF) in accordance with Article 10.2 of the Directive.
The product herewith also complies with the requirements of the Low Voltage Directive 73/23/EEC based on design analysis and testing in accordance with Article 13, Annex IV of Directive 93/68/EEC, amending Directive 73/23/EEC.

Technical Construction File:

Prepared by:	Steven De Clario
Function:	Electrical Engineer
Company:	Glassman High Voltage, Inc PO Box 317 124 West Main Street High Bridge, NJ 08829-0317 USA
TCF number:	40122SH.TCF
Date:	April, 2000
Competent Body:	NMi Certin B.V. P.O. Box 15 9822 ZG Niekerk The Netherlands
Signature:	Steven De Clario
Function:	Staff Engineer
Date:	April 10, 2000

EC Representative: Glassman Europe Limited, 21 Campbell Court, Campbell Road, Bramley, Tadley, Hampshire RG265EG, England.

EMC Directive Addendum

For SH models with CE option.

Your high voltage power supply has been designed and tested to ensure compliance with the European Community's EMC directives when used as described in the instruction manual. However, as we do not supply as standard remote interface cables, the following precautions must be followed in order to ensure continued compliance with EMC directive radiated emissions requirements as specified in the harmonized standard EN55011:1991 Group 1, Class A.

1 The remote interface cables must be of a shielded type with the shields and connector housings terminated to an adequate ground source at both ends of the cable. At the power supply end, Pin 1 of TB1 provides a ground connection for the terminal block interface cable shield, and Pin 24 or 25 of J5 or the "D" connector housing provides a ground connection for the "D" connector interface cable shield.

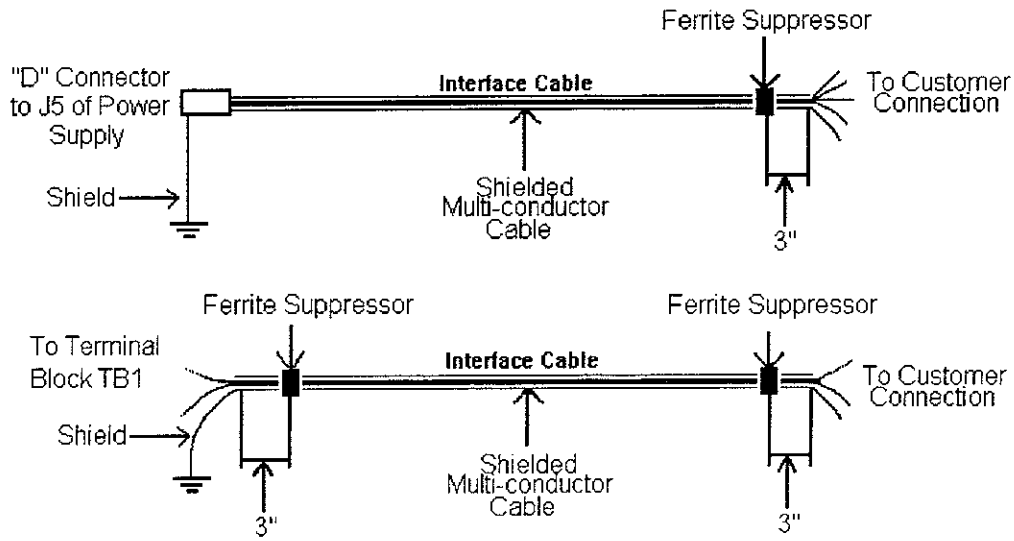
2. A ferrite suppressor must be placed at both ends of the TB1 cable and at the customer end of the "D" connector cable over the shields. These suppressors must be located within 3" of the terminations of each end of the cables (see drawing below). The ferrite suppressors should have the following properties:

Impedance should be greater than 200 ohms at 100MHz.

For your convenience, we have made available kits that contain the required ferrite suppressors for each cable. Contact your Glassman representative for further information.

If your power supply is a modified standard and contains any additional interface connectors, each additional interface cable must follow the same precautions as stated above.

Please note that if the digital panel meters are subjected to radiated EMC fields in excess of 3V/m the display value may read incorrectly. However, the actual HV output remains stable and the true HV output level can be read from the voltage monitor.



UNPACKING AND INSPECTION

First inspect package exterior(s) for evidence of rough handling in transit. If none, proceed to unpack carefully. After removing the supply from its shipping container, inspect it thoroughly for damage.

IMPORTANT! In cases of damage due to rough handling in transit, notify the carrier immediately if damage is evident from appearance of package. Do not destroy or remove any of the packing material used in a damaged shipment. Carrier companies will usually not accept claims for damaged material unless they can inspect the damaged item and its associated packing material. Claims must be made promptly - certainly within five days of receipt of shipment.

CORRESPONDENCE

Each Glassman power supply has an identification label on the chassis that bears its model and serial number. When requesting engineering or applications information, reference should be made to this model and serial number. If specific components or circuit sections are involved in the inquiry, also indicate the component symbol number(s) shown on the applicable schematic diagram.

GLASSMAN HIGH VOLTAGE, INC
PO Box 317
124 West Main Street
High Bridge, N.J. 08829

TEL 908-638-3800
FAX 908-638-3700
E-MAIL Support@GlassmanHV.com
www GlassmanHV.com

SAFETY

This symbol, wherever it appears on the supply, alerts you to the presence of uninsulated dangerous voltages - voltages that may be sufficient to constitute a risk of electrical shock

This symbol, wherever it appears on the supply, alerts you to important operating and maintenance instructions in the accompanying literature. Read the manual.

TERMS IN THIS MANUAL

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING! statements identify conditions or practices that could result in injury or loss of life

WARNING!

To avoid the risk of shock or fire do not attempt to service the supply beyond that described in these instructions.

To avoid the risk of shock and personal injury, do not remove the product covers while the unit is operating or connected to the AC mains. Wait at least 2 minutes after disconnecting the AC mains power before removing any covers or panels. Wait at least 15 seconds before disconnecting the HV cable.

Upon loss of protective ground connection(s), all accessible conductive parts can render an electric shock.

Use only a power cord rated greater than the input current rating of the unit. Use only a cord in good condition.

To avoid fire hazard, use only fuses of the correct type, voltage rating, and current rating as specified.

To avoid explosion, do not operate this product in an explosive atmosphere.

If liquid is spilled on the supply, shut it off immediately and disconnect it from the AC mains.

Always maintain adequate supply ventilation. All ventilation openings must remain free from obstruction.

PREPARATION FOR USE

The power Supply consists of two chassis assemblies, the control chassis and the driver chassis. All input and interface connections are made to the control assembly The HV output is provided on the driver assembly (Refer to the Outline and Installation Drawing included with this manual)

CAUTION: All interconnections between the driver and control chassis must be installed with the cables provided before AC line power is applied.

LINE VOLTAGE

This supply is capable of continuous operation using input voltages of 208 VAC +/-10 %, 3 phase. 48-63 Hz

INPUT POWER

Four 10-32 terminals (L1, L2, L3 & GND) located on the line filter FL1 are provided at the rear of the control module, behind a removable cover plate, for connection to three phase AC power. The power cord employed should contain wires capable of supplying at least 40 amperes RMS each. A compression strain relief bushing is provided for securing a round AC input cord with an outside diameter of from .62" to .75" This bushing is installed in a 3/4 NPT hole provided in the cover plate. If a cord is employed that differs from the above style and diameter, the user must replace the bushing provided with one appropriate for the application. Master/Slave supplies have one additional set of AC input terminals per slave control chassis. A separate line cord must be provided for each control module

MAINS SERVICE MUST BE PROTECTED WITH FUSES OR CIRCUIT BREAKERS WITH A MAXIMUM RATING OF 125 A AND A MINIMUM INTERUPTING CAPACITY OF 5,000 A

Note: When installing, thread the power cord through the strain relief bushing before making connections to FL1. After making the connections move the cover into position and secure with the 4 captive screws Then tighten the compression strain relief. It is recommended that some means be provided for disconnecting the unit(s) from the mains, such as an appropriate plug/jack combination or a distribution box with safety switch or circuit breaker.

Caution: The protective cover plate must be installed and the terminal marked "GND" must be connected to a good earth ground for electrical shock protection. In Europe, this ground wire must be green/yellow in color

For CE compliant supplies used in Europe:
Please refer to the Declaration of Conformity located elsewhere in this manual for installation environment conditions required to conform to 73/23/EEC (Low Voltage Directive).

AC POWER BREAKER/SWITCH

The breaker/switch is located on the front panel of the control chassis. In addition, on master/slave systems, there is one breaker on each slave control chassis.

INSTRUMENT COOLING

Always maintain adequate supply cooling. All ventilation holes must remain free from obstruction.

REVERSE POLARITY

Reverse Polarity Supplies ≤6kV (standard):

A polarity card is provided, internal to the unit, to reverse the output polarity of the supply. If it is desired to determine the present setting of the polarity or to change the polarity, follow the procedure below (refer to the AM10-SH parts placement drawing):

WARNING!:

TO AVOID THE RISK OF SHOCK AND PERSONAL INJURY, WAIT AT LEAST 2 MINUTES AFTER DISCONNECTING THE AC MAINS POWER BEFORE REMOVING ANY COVERS OR PANELS.

1. Remove the bottom cover from the driver chassis.
   BE SURE AC POWER IS DISCONNECTED AND HV IS DISCHARGED!
2. Locate the high voltage board A4-1 mounted towards the rear section of the chassis (as viewed from the front).
3. Locate the polarity card (A4-2) plugged into the high voltage board and observe that the card is labeled to indicate the installed polarity.
4. If it is desired to change the polarity of the supply, simply unplug the card, flip it over and reinstall it carefully. Make sure the card is fully inserted (seated).
5. Replace the bottom cover.
6. Repeat the above procedure (if applicable) for all slaves in master/slave systems.
   CAUTION: All polarity cards in master/slave systems must be installed for the same polarity. The supplies will not operate if this is not the case.

Reverse Polarity Supplies >6kV (optional):

Two high voltage assemblies are provided with each supply (and slave where applicable): one is mounted in the supply (normally the positive one), the other one is shipped separately. To verify the polarity of the assembly installed, the bottom cover may be removed from the driver assembly of the supply. **BE SURE AC POWER IS DISCONNECTED AND HV IS DISCHARGED!** The large white enclosure (the high voltage assembly) will have a label affixed to the top which indicates its polarity.

It is required that the two high voltage assemblies be exchanged to reverse the output polarity. This

may be done in the following manner (refer to the AM10-SH parts placement drawing):

WARNING!:

TO AVOID THE RISK OF SHOCK AND PERSONAL INJURY, WAIT AT LEAST 2 MINUTES AFTER DISCONNECTING THE AC MAINS POWER BEFORE REMOVING ANY COVERS OR PANELS.

1. If the supply has been running, the output must be discharged or allowed to bleed down for a few minutes
2. Disconnect the AC power from the supply.
3. Remove the high voltage cable from the supply.
4. Remove the top & bottom covers from the driver chassis
5. Position the unit with the top facing up. Unplug the HV AC cables from A2-J3 & A3-J2.
6. Turn the chassis over so that the bottom is facing up. Unplug and disconnect the cable harness from A4-J1 and A4-J2. Unplug and disconnect the fastons from A4-E22 and A4-E23. Remove the nut and hardware securing the ground wire to EG3. Dress all loose wires away from the HV assembly
7. Remove the screws holding the rear panel behind A4 and let the panel hinge back
8. Carefully pull the HV AC silicone wires up through their guide tubes and let them hang free
9. A4 is secured to the chassis by means of an angle bracket. Remove the three nuts and associated hardware holding the bracket to the chassis.
10. Remove A4 by lifting straight up. Install the high voltage assembly of opposite polarity in its place.
11. Reassemble the supply in reverse order of disassembly
12. Repeat the above procedure (if applicable) for all slaves in master/slave systems

CAUTION:

- Nuts holding the brackets to the chassis must be installed and must be tight to provide proper grounding for A4.
- Be careful when reinstalling J1 & J2. Be sure that plugs and jacks are properly aligned and mated
- All high voltage assemblies installed in master/slave systems must be of the same polarity. The supplies will not operate if this is not the case.

CONTROLS, CONNECTORS, AND INDICATORS

CONTROL CHASSIS FRONT PANEL
(Refer to Outline and interface Drawings)

POWER Circuit Breaker/Switch - Turns the supply power on and off (1 / ON, 0 / OFF).

POWER ON indicator - Illuminates when the POWER Switch/Circuit Breaker is ON and the AC

input power is present

REMOTE PROGRAMMING Switches and Indicators - These switches provide a means to select certain functions as designated for remote operation (e g when signals for these functions are to be applied to the customer interface connectors J5 & TB1) The associated indicators will light when the switches are in the remote position (toggled to the right) The three selectable functions are:

- **REMOTE PROGRAMMING mA** - Allows the output current to be controlled with an external analog signal (front panel control is disabled)
- **REMOTE PROGRAMMING kV** - Allows the output voltage to be controlled with an external analog signal (front panel control is disabled)
- **REMOTE HV ON/OFF** - Allows for two separate external momentary switches to control the high voltage enable function (front panel HV ON & OFF switches are disabled)

INTERLOCK Indicator - Shows that an open is/was present in the customer interlock circuit High voltage output is disabled and cannot be enabled until the open interlock is corrected (closed) and the system is re-enabled

FAULT Indicator - Illuminates when one or more of the following fault conditions are present:

- One or more cooling fans are slow or inoperative
- Insufficient AC line voltage is present
- The power supply temperature is too high
- The main DC buss is shorted (circuit failure)
- An internal bias voltage is low or missing (circuit failure)
- There is a fault in the slave module or open master/slave interconnect cable (master slave systems only)

HIGH VOLTAGE OFF Indicator - Illuminates when the high voltage is off The HIGH VOLTAGE OFF indicator will remain illuminated after an attempt is made to enable the HV if one or more of the following conditions is present:

- A signal or power interconnect cable is open or disconnected
- The REMOTE HV ON/OFF switch is set for remote operation and a remote contact closure is not present at TB1-9 to TB1-10 or TB1-11 to TB1-12
- One or more cooling fans are slow or inoperative
- The main DC buss is shorted (circuit failure)
- An internal bias voltage is low or missing (circuit failure)
- There is a FAULT or OVERVOLTAGE indication in a slave module or open master/slave interconnect cable (master slave systems only)

HIGH VOLTAGE ON Indicator - Illuminates when the high voltage is on

HIGH VOLTAGE ON Push-button - Enables the high voltage output when actuated This push-button will NOT activate when one or more of the following conditions are present:

- The FAULT indicator is illuminated
- The REMOTE HV ON/OFF switch is set to the remote position
- There is an open interlock (INTERLOCK indicator is illuminated)

HIGH VOLTAGE OFF Push-button - Turns off the high voltage output and resets the following latching faults:

- CURRENT TRIP (if enabled by rear panel switch)
- ARC TRIP (if ARC TRIP option is factory installed)

KILOVOLT CONTROL - Sets the output voltage regulation point

0 00 = 0 00 kV
10 00 = Maximum rated output voltage

KILOVOLT CONTROL Indicator - Illuminates when supply is in the voltage regulation mode

KILOVOLT Digital panel meter - Displays output voltage in kilovolts (unless otherwise specified)

MILLIAMPERE/AMPERE CONTROL - Sets the output current regulation point

0 00 = 0 00 mA or A
10 00 = Maximum rated output current

MILLIAMPERE/AMPERE CONTROL Indicator - Illuminates when the supply is in the current regulation mode or a MILLIAMPERE FAULT has occurred

MILLIAMPERE/AMPERE Digital Panel Meter - Displays output current in milliamperes or amperes (unless otherwise specified)

POLARITY Indicators (POS, NEG) - Displays the polarity with respect to ground of the high voltage output

Slave Modules (Master/Slave Supplies Only):

POWER Indicator - Will light when the AC POWER circuit breaker on the slave module is in the ON / 1 position, if AC power is applied to the modules

BIAS Indicator - Is normally not illuminated when the AC power is applied Will light if any of the following conditions are present:

- An internal bias voltage is missing
- The input AC line voltage is insufficient
- An over-temperature condition has occurred

FAN Indicator - Will illuminate when one or more cooling fans are slow or inoperative

TRACKING Indicator - This indicator will illuminate if the slave module is not tracking the master The tracking circuit will latch and shutdown the supply if the condition persists for

more than approximately 500 mS TRACKING shutdown can only be reset by AC power-down, either by the master module power switch or by disconnecting the supply from the AC mains It is normal for this indicator to momentarily illuminate during load or programming transients

SYSTEM Indicator - Will Illuminate if the master and slave high voltage polarities do not match (This applies only to reversible polarity supplies.)

TP-I Testpoint - A 0 to 10 V service testpoint for measuring the relative output current of a slave module

TP-V Testpoint - A 0 to 10 V service testpoint for measuring the relative output voltage of a slave module

TP-C Testpoint - The common return point for the instrument(s) measuring the TP-V and/or TP-I testpoints

CONTROL CHASSIS REAR PANEL
(Refer to Outline and Interface Drawings)

FL1 AC Input Filter - Input power connections are made directly to the line filter, FL1 as follows (with one additional set of connections per slave on master/slave supplies):

L1	Phase 1
L2	Phase 2
L3	Phase 3
GND	Earth Ground

For CE compliant supplies used in Europe:
Please refer to the Declaration of Conformity located elsewhere in this manual for installation environment conditions required to conform to 73/23/EEC (Low Voltage Directive).

TB1 Connector - Customer interface Provides connections for COMMON, GROUND, INTER-LOCK, TTL ENABLE and HV ON/OFF control signals

(explained in greater detail later)

J1, J2 J3 & J4 Connectors - Provides connections for chassis interconnect cables between control and driver chassis

J5 Connector - Customer interface Provides connections for remote control and monitor signals

(explained in greater detail later)

J6 Connector - This connector provides the interface signals needed for parallel operation to J5 of the first slave chassis (only used on master/slave supplies)

J7 Connector - Unused

POWER ON Indicator - Illuminates when AC power is ON.

E1 Terminal - This terminal should be connected to E1 on the driver chassis using the ground cable provided. E1 on the driver chassis should be solidly connected to a good earth ground.

Slave Modules (Master/Slave Supplies Only):

J5 Connector - This connector provides the interface signals needed for parallel operation from J6 of the master chassis or J6 of the nearest upstream slave chassis.

J6 Connector - This connector provides the interface signals needed for parallel operation to J5 of the nearest downstream slave chassis. In the case of the last slave chassis, a terminator plug is installed on J6.

E1 Terminal - Chassis GROUND. This is the ground connection for the slave module and MUST be connected back to E1 of the master module, either directly or via the E1 ground terminal of the next upstream slave modules.

DRIVER CHASSIS REAR PANEL
(Refer to Outline and Interface Drawings)

J1, J2 J3 & J4 Connectors - Provides connections for chassis interconnect cables between control and driver chassis.

E1 Terminal - WARNING!! E1 MUST be grounded. This is the main ground connection for the power supply system. The E1 terminal on both chassis should be connected together using the ground cable provided. E1 on the driver chassis should be solidly connected to a good earth ground.

JHV1 Connector - High voltage output (one additional output per slave for master/slave supplies)

WARNING!

DO NOT HANDLE EXPOSED HIGH VOLTAGE TERMINATIONS OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 60 SECONDS TO FULLY DISCHARGE.

INSTALLATION AND OPERATION

The following procedure should be followed to connect and operate the equipment after it has been placed or mounted in position.

WARNING!

NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE MAIN GROUND STUD E1 ON DRIVER CHASSIS (E1 OF MASTER DRIVER CHASSIS ON MASTER SLAVE SUPPLIES).

THE LOAD RETURN SHALL ALSO BE CONNECTED TO THE MAIN GROUND STUD.

ALWAYS MAKE CERTAIN THAT MULTI-CHASSIS SUPPLIES HAVE THEIR INTER-CHASSIS GROUNDING STRAPS AND/OR BUSSBARS INSTALLED AS SHOWN IN THE INSTALLATION DRAWING(S) AND SCHEMATIC(S) SUPPLIED.

THE GROUND WIRE OF THE AC LINE CORD SHALL BE GROUNDED FROM THE AC GROUND TO FL1 GROUND (ON ALL FL1 GROUNDS FOR MASTER/SLAVE SUPPLIES)

READ AND FULLY UNDERSTAND THE OPERATING INSTRUCTIONS BEFORE APPLY-ING POWER TO THIS UNIT.

THIS EQUIPMENT EMPLOYS VOLTAGES THAT ARE DANGEROUS. EXTREME CAU-TION MUST BE EXERCISED WHEN WORKING WITH THIS EQUIPMENT.

DO NOT HANDLE THE LOAD OR EXPOSED HIGH VOLTAGE TERMINATIONS, OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 60 SECONDS TO FULLY DISCHARGE.

INITIAL TURN ON

It is suggested that the operator become familiar with the operation of the unit under local (front panel) control and then add the remote functions as desired Thus, the initial turn on sequence described below assumes that there are no signals applied to the customer interface connectors J5 & TB1 and that the common and interlock terminals are strapped together (TB1-2 TO TB1-3)

Please verify the following:

1. That the AC power is disconnected from the unit, either by the disconnecting of an appropriate three phase plug/jack combination or, if the supply is wired directly to the mains, by setting the power breaker or safety switch to OFF
2. That there are no signals applied to J5 or TB1
3. That a good earth ground is connected the main ground stud, E1, as described in the WARNING! statement above
4. That the proper grounding straps and/or bussbars have been installed between chassis as shown in the installation drawing.

5. That all inter-chassis wires and cables have been installed in accordance with the schematic/ interface drawings supplied.
6. That the front panel switches and controls are set as follows:

POWER ON Breaker	Off / 0
REMOTE PROGRAM Switches	LOCAL (left)
KILOVOLT CONTROL	Counterclockwise
MILLIAMPERE/AMPERE CONTROL	As required for load. 1.00 = 10 % of rating 5.00 = 50 % of rating. etc.

7. That the rear panel switches are set as follows:

TTL	LOCAL (up)
CURRENT	LIMIT (up)

Attach load as follows (optional):

1. Connect the load return to the main ground stud on the driver chassis.

WARNING!

NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE MAIN GROUND STUD E1 ON THE DRIVER CHASSIS (E1 OF MASTER DRIVER CHASSIS ON MASTER/SLAVE SUPPLIES).

2. Connect the HV end of the load to the high voltage output cable (stripped and tinned end) provided.
3. Insert the plug end of the high voltage cable(s) into the high voltage receptacle(s). Screw the threaded barrel onto the receptacle JHV1 on the rear panel of the driver chassis. Spring action should be felt as the probe reaches the bottom. Hold the cable pressed down against the spring as the threaded barrel is screwed onto the receptacle.

Power up sequence:

1. Make appropriate line cord connections to the power source.
2. Set the POWER switch on the front panel to the ON / 1 position. The following indicators should be illuminated:
   - POWER
   - HIGH VOLTAGE OFF
   - KILOVOLT CONTROL
   - POS or NEG POLARITY

3. Activate the high voltage output by depressing HIGH VOLTAGE ON button. The HIGH VOLTAGE OFF lamp will extinguish and the HIGH VOLTAGE ON lamp will illuminate
4. Rotate KILOVOLT CONTROL clockwise until the KILOVOLT digital panel meter indicates the desired voltage. If the MILLIAMPERE/AMPERE CONTROL indicator illuminates before the desired voltage is achieved, the supply has gone into constant current mode (current limit) and the setting of the MILLIAMPERE/AMPERE CONTROL will have to be increased to supply the required current to the load, at the desired kV level.
5. The high voltage can be turned off by depressing the HIGH VOLTAGE OFF push-button. The supply will go into the standby mode: HIGH VOLTAGE OFF lamp on, HIGH VOLTAGE ON lamp off. The high voltage can also be turned off by shutting down the supply with the POWER breaker. When the supply is again powered up, the unit will go into the standby mode.

NOTE: When the high voltage ON/OFF function is under local (front panel) control, the supply will always power-up in standby mode regardless of whether the high voltage was enabled or disabled at power-down.

WARNING!

DO NOT HANDLE THE LOAD OR EXPOSED HIGH VOLTAGE TERMINATIONS OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 60 SECONDS TO FULLY DISCHARGE.

REMOTE CONTROL AND MONITOR SIGNALS (Refer to customer interface drawing)

NOTE: It is recomended that shielded cable(s) be used for these connections and that the shield be terminated to ground.

For CE compliant supplies used in Europe:
Please refer to the EMC addendum located elsewhere in this manual for shielding, terminating filtering conditions required to conform to 89/336/EEC.

CONTROL CHASSIS TB1 CONNECTIONS:

TB1-1 GROUND

This terminal is connected directly to the chassis and is provided for cable shield termination.

TB1-2 COMMON

This terminal establishes the main reference point for the supply. COMMON is connected internally to GROUND. This terminal provides a convenient return connection for INTERLOCK and TTL signals.

TB1-3 INTERLOCK

This terminal must be connected to COMMON for the high voltage to be enabled The supply is shipped with this terminal tied to the adjacent COMMON terminal by means of a terminal jumper This jumper may be removed and a pair of wires may be installed in its place, which then may be connected to a switching device, such as a door interlock switch

When the unit is in the standby mode (HIGH VOLTAGE OFF indicator illuminated), an open circuit at the INTERLOCK terminal will cause the INTERLOCK lamp to light The interlock circuit will not allow the high voltage to be activated either by the front panel HIGH VOLTAGE ON button or by the REMOTE HV ON contact closure When the INTERLOCK terminal is again connected to COMMON, the system will revert back to the normal standby condition

If the high voltage is already enabled, an open circuit at the INTERLOCK terminal will disable the high voltage Even if the open interlock is reconnected, the high voltage will remain off until a HIGH VOLTAGE ON command is received either by the front panel HIGH VOLTAGE ON button or by the REMOTE HV ON contact closure

TB1-5 TTL ENABLE

This terminal is connected in parallel with J5-22 Refer to J5-22 description

TB1-9 REMOTE HV OFF
TB1-10 REMOTE HV OFF
TB1-11 REMOTE HV ON
TB1-12 REMOTE HV ON

These terminals provide for control of the HIGH VOLTAGE ON and HIGH VOLTAGE OFF functions remotely when the front panel REMOTE HV ON/OFF switch is set to the REMOTE position Under remote control, the front panel ON and OFF indicators will function normally, but the ON and OFF push-buttons are disabled For remote operation, the user must provide one normally open momentary switch connected across the REMOTE HV ON terminals and one normally closed momentary switch connected across the REMOTE HV OFF terminals Actuating the remote HV ON switch for > 50 ms turns the HV on Actuating the remote HV OFF switch for > 50 ms turns the HV off

Note:

- Installing a permanent connection across the REMOTE HV ON terminals will cause the supply to generate HV immediately upon the application of AC power (assuming there are no faults). In addition, if the interlock is opened disabling the HV, closure of the interlock will cause the HV to turn on immediately

- Installing a permanent connection across the REMOTE HV OFF terminals will not allow the HV to be shut off except by the removal of AC power or the introduction of a fault or open interlock.

TB1-4 RESERVED
TB1-5 RESERVED
TB1-7 RESERVED
TB1-8 RESERVED

These terminals are reserved for special options or expansion of features

CONTROL CHASSIS J5 CONNECTIONS

J5-2 PROGRAM RETURN
J5-3 PROGRAM RETURN
J5-8 MONITOR RETURN
J5-9 MONITOR RETURN

These pins are the analog programming and monitoring returns The PROGRAM RETURNS are connected together as one floating return, and the MONITOR RETURNS are connected together as a separate independent floating return When instruments are attached to these returns they will "float" to the level of the ground or common potential at the measuring or programming instrument The differential amplifier circuitry employed automatically adjusts the program and monitor signals to compensate for the difference between COMMON and the ground or common potential at the instrument This results in a reduction of AC noise and DC offset components between the power supply and the measuring and/or programming instrument

Caution: Do not allow PROGRAM RETURN or MONITOR RETURN to exceed more than a ±3 V difference with respect to supply COMMON.
RETURNS MUST BE CONNECTED TO A LOW IMPEDANCE SOURCE TO INSURE ACCURATE READINGS.

J5-6 COMMON
J5-18 COMMON

These signal commons are provided as a return for TTL HV ENABLE and if desired, a connection point to reference any of the following signals:

- PROGRAM RETURN
- MONITOR RETURN
- CONTROL STATUS (COM)
- HV STATUS (COM)
- FAULT STATUS (COM)

J5-24 GROUND
J5-25 GROUND

These connections are for instrumentation grounding These connections can be used to ground the shield of the CUSTOMER INTERFACE cable These connections should NOT be used as the main

connection to earth ground Use the main ground terminal, E1 on the driver chassis, for that purpose

J5-5 +10 V REFERENCE
J5-17 +10 V REFERENCE

This output is an ultra-stable, positive 10 V reference that is supplied for user programming applications Maximum current drain should be limited to 4 mA

It is suggested that if this output is to be used for programming, that the PROGRAM RETURN be connected to COMMON This reference is regulated to COMMON not the PROGRAM RETURN and may cause an error in programming level equal to the differential between the commons An external reference regulated to PROGRAM COMMON may be used if required

J5-22 TTL ENABLE

For this input to function, the rear panel TTL switch must be in the REMOTE (down) position When the switch is in the REMOTE position, actuating the HIGH VOLTAGE ON switch (either front panel or external) will not generate HV unless there is a "HIGH" (+2 5 V to +5 V) signal present at this connection (Since the input is clamped to a zener diode through a 10 k ohm impedance, any voltage from 5 to 15 V is acceptable for enabling this input) A "LOW" (V = 0 to 2 0 V) or disconnect will turn the high voltage off (This will also reset CURRENT TRIP if enabled)

Unlike the front panel push-buttons, the signal applied to the TTL ENABLE input must be a constant, not momentary signal An example of how the TTL ENABLE signal operates the high voltage follows:

1 AC power is applied to the supply with TTL ENABLE "LOW" Supply is now in standby mode
2 The HIGH VOLTAGE ON switch is actuated (either front panel or external) The supply is no longer in standby, but the HV generation is inhibited by the TTL ENABLE signal
3 A "HIGH" signal is sent to the TTL ENABLE input, turning on the high voltage
4 Sometime later, with the supply set for current trip (rear panel CURRENT switch in TRIP position), an overcurrent occurs and he HV latches off The supply is now in current trip mode as indicated by the illumination of the MILLIAMPERE/AMPERE CONTROL lamp
5 The "HIGH" signal at the TTL ENABLE input is brought "LOW", resetting the current trip circuit as indicated by the MILLIAMPERE/AMPERE CONTROL lamp extinguishing and the KILOVOLT CONTROL lamp illuminating The HV remains off due to the TTL ENABLE "LOW"
6 A high signal is again applied to the TTL ENABLE input and the high voltage output returns

J5-1 V PROGRAM

This input becomes active when the front panel REMOTE PROGRAMMING kV switch is in the REMOTE position; the front panel KILOVOLT CONTROL is then disabled A 0 to +10 V signal with respect to PROGRAM RETURN at this input will program the output voltage proportionally from zero

to full output. There are several ways to program this input:

- A user supplied 0 to +10 V signal (such as a D to A converter).
- A user supplied potentiometer (5 to 50 k ohms, 10 k nominal) can be connected between the +10 V REFERENCE and PROGRAM RETURN with the wiper connected to V PROGRAM and the PROGRAM RETURN connected to COMMON.
- The V PROGRAM input may be jumpered to the +10 V REFERENCE and the PROGRAM RETURN connected to COMMON for a fixed output at the maximum voltage. A resistor divider could also be used to program any fixed voltage.

Note: The PROGRAM RETURN should always be terminated by a low impedance source to within ±3 V of ground at the programming source. Leaving the PROGRAM RETURN "floating" will introduce noise and offsets on the programming signal.

J5-4 I PROGRAM

This input becomes active when the front panel REMOTE PROGRAMMING mA switch is in the REMOTE position; the front panel MILLIAMPERE/AMPERE CONTROL is then disabled. A 0 to +10 V signal with respect to PROGRAM RETURN, at this input will program the output voltage proportionally from zero to full output. There are several ways to program this input:

- A user supplied 0 to + 10 V signal (such as a D to A converter).
- A user supplied potentiometer (5 TO 50 k ohms, 10 k nominal) can be connected between the +10 V REFERENCE and PROGRAM RETURN with the wiper connected to I PROGRAM and the PROGRAM RETURN connected to COMMON.
- The I PROGRAM input may be jumpered to the +10 V REFERENCE and the PROGRAM RETURN connected to COMMON for a fixed output at the maximum voltage. A resistor divider could also be used to program any fixed voltage.

Note: The PROGRAM RETURN should always be terminated by a low impedance source to within ±3 V of ground at the programming source. Leaving the PROGRAM RETURN "floating" will introduce noise and offsets on the programming signal.

J5-7 V MONITOR

This output is a 0 to 10 V signal, positive with respect to MONITOR RETURN, and in direct proportion to the output voltage. A 10 k ohm limiting impedance protects the internal circuitry. Thus, the instrument monitoring this output should have an input impedance greater than 10 megohms, otherwise, the accuracy of the measurement will be degraded. It is also acceptable to use a 1 mA full scale analog meter for monitoring purposes.

Note: The MONITOR RETURN should always be terminated by a low impedance source to within ±3 V of ground at the monitoring instrument. Leaving the MONITOR RETURN "floating" will introduce noise and offsets on the monitor signal. It is suggested when a high impedance instrument is employed, that a

small bypass capacitor (such as 0.01 uF) be added at the instrument between the V MONITOR line and MONITOR RETURN, to reduce any high frequency noise that may be picked up on the line.

J5-10 I MONITOR

This output is a 0 to 10 V signal, positive with respect to MONITOR RETURN, and in direct proportion to the output current. A 10 k ohm limiting impedance protects the internal circuitry. Thus, the instrument monitoring this output should have an input impedance greater than 10 megohms, otherwise, the accuracy of the measurement will be degraded. It is also acceptable to use a 1 mA full scale analog meter for monitoring purposes.

Note: The MONITOR RETURN should always be terminated by a low impedance source to within ±3 V of ground at the monitoring instrument. Leaving the MONITOR RETURN "floating" will introduce noise and offsets on the monitor signal. It is suggested when a high impedance instrument is employed, that a small bypass capacitor (such as 0.01 uF) be added at the instrument between the V MONITOR line and MONITOR RETURN, to reduce any high frequency noise that may be picked up on the line.

STATUS MONITOR SIGNALS

Three status monitor signals are provided for logic or computer interface. These signals are supplied by means of "Form C" (SPDT) relay contacts. The contact ratings are 24 V @ 1 A max. and are isolated from ground by 60 VDC maximum. The three sets of status monitor relay connections are as follows:

J5-13 V CONTROL STATUS (NC)
J5-12 I CONTROL STATUS (NO)
J5-11 CONTROL STATUS (COM)

When the supply goes into current regulation or CURRENT TRIP mode (as determined by the rear panel CURRENT switch), the CONTROL STATUS relay energizes and the CONTROL STATUS (COM) contact transfers from V CONTROL (NC) to I CONTROL (NO).

J5-14 HV STATUS (NC)
J5-15 HV STATUS (NO)
J5-16 HV STATUS (COM)

When the supply begins generating HV, the HV STATUS relay energizes and the HV STATUS (COM) contact transfers from HV STATUS (NC) to HV STATUS (NO).

J5-19 FAULT STATUS (NC)
J5-20 FAULT STATUS (NO)
J5-23 FAULT STATUS (COM)

When an internal fault occurs, the FAULT STATUS relay energizes and the FAULT STATUS (COM) contact transfers from FAULT STATUS (NC) to FAULT STATUS (NO).

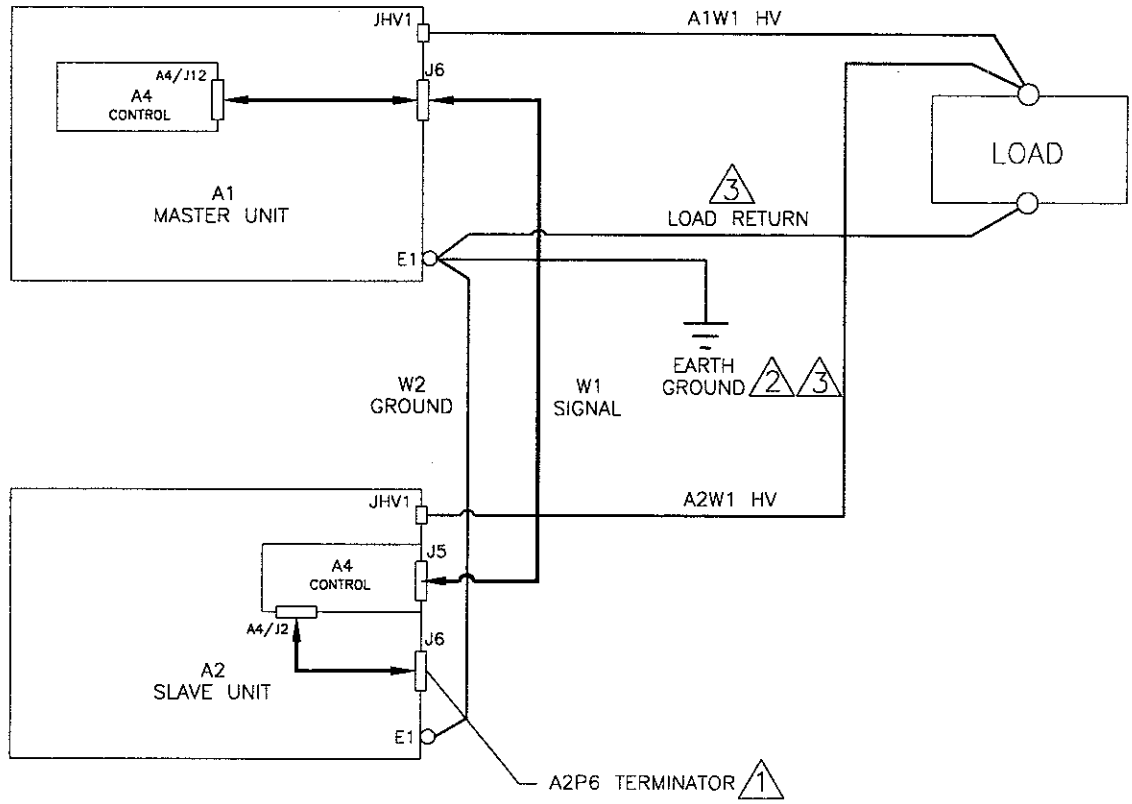
As an illustration of how FAULT STATUS and HV STATUS signals differ, consider the following scenario:

1. Initially, there is no AC power applied and all status relays are de-energized
2. AC power is applied with a "HIGH" on the TTL ENABLE (with TTL switch set to REMOTE) There is no change to the status relays (assuming there are no faults)
3. The HIGH VOLTAGE ON push-button is pressed causing the generation of HV and the HV STATUS relay to energize
4. Sometime later, a fan fails inside the unit causing a fault and shutting off the high voltage The FAULT STATUS relay energizes to indicate the presence of a fault and the HV STATUS relay de-energizes indicating the absence of HV at the output.
5. An attempt is made to restart the HV by depressing the HV on switch and toggling the TTL ENABLE signal, but the fault prevents the HV from being enabled and there is no effect on the HV STATUS relay
6. The supply is powered down and the defective fan is replaced
7. AC power is applied with a "LOW" TTL ENABLE signal The FAULT STATUS relay is de-energized because there is no longer a fan fault.
8. The HIGH VOLTAGE ON button is pressed causing the HIGH VOLTAGE ON lamp to illuminate However, the HV STATUS relay does not energize and no HV is generated because the TTL ENABLE is still low.
9. Upon bringing the TTL ENABLE signal "HIGH", HV is generated and the HV status relay energizes

J5-21 RESERVED

This connection is reserved for special options or future expansion of features

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6365: REF TO NEXT SLAVE REMOVED, FIXED P5 & P6 GENDER	110999	SD
B	TJM	ECN 6454: ADDED NOTES 2 & 3	011900	J.M.



NOTES:

1. TERMINATOR IS A MALE PLUG WITH PINS 2 AND 3 WIRED TOGETHER & PINS 4 AND 5 WIRED TOGETHER, TO BE CONNECTED TO J6 OF SLAVE UNIT

2. WARNING!! NEVER OPERATE THIS SYSTEM WITHOUT A GOOD EARTH GROUND CONNECTED AS SHOWN.

3. PROVIDED BY USER.

MODULE INTERCONNECT CABLE

M F

P6 P5

SIGNAL	MASTER	SLAVE 1
SLAVE HV ON	1	1
SLAVE FAULT +	2	2
SLAVE FAULT −	3	3
SLAVE TTL	6	6
COMMON	7	7
POLARITY	8	8
RESERVED	9	9
V PROGRAM	11	11
IFB	12	12
I PROGRAM	13	13
SIGNAL COMMON	14	14
SHIELD GROUND	NC	15

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE :
DEC XXX ± XX ±
DEG ±

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FILE NO. EXTENSION
\1000\66001B.DWG

APPROVALS	DATE
DRAWN TJM	100199
CHECKED SD	100199
RELEASED	

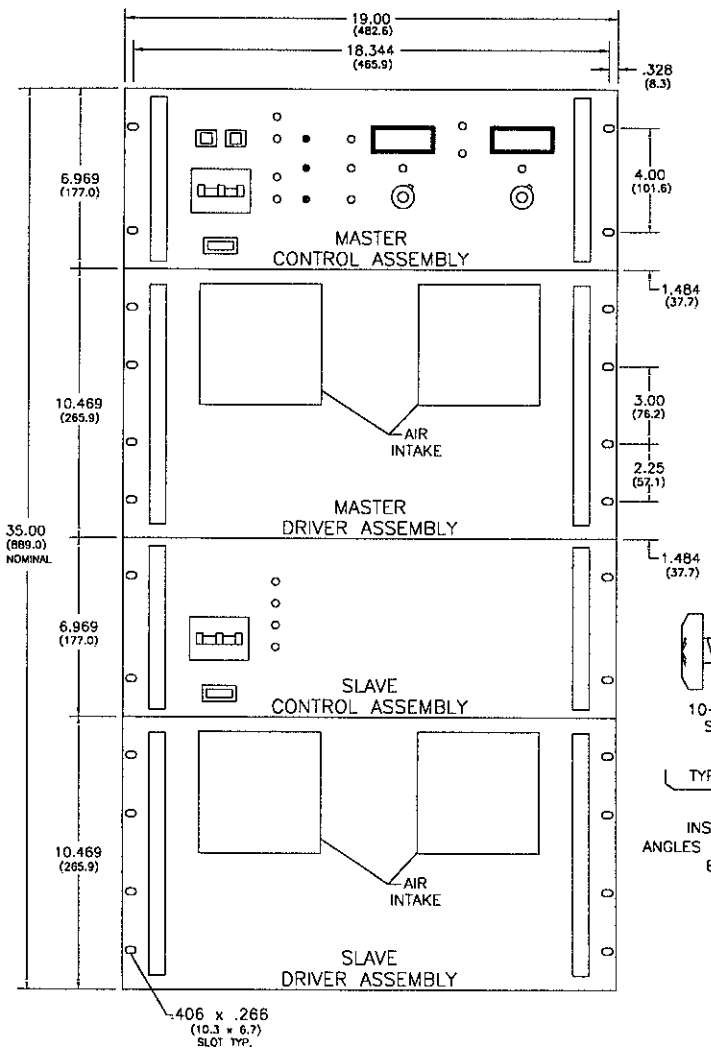
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889
(908) 534-9007 FAX (908) 534-5672

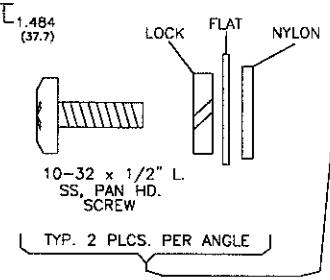
TITLE
SYSTEM SCHEMATIC
SH MASTER/SLAVE

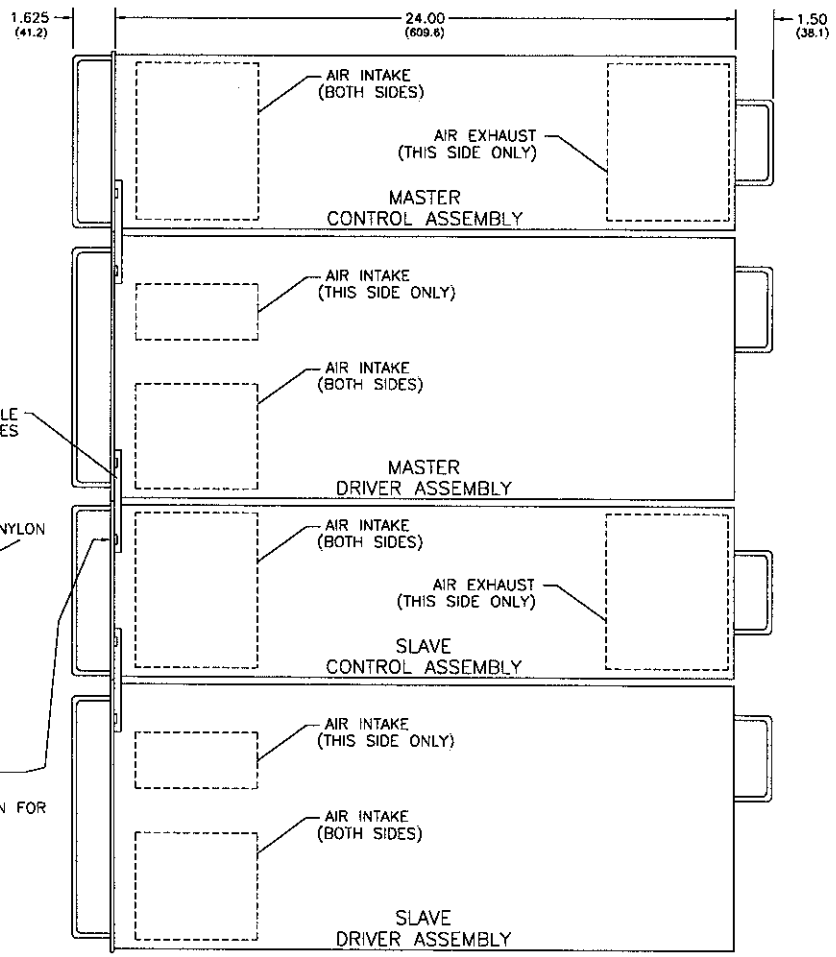
A | DWG.NO. 100066-001 | REV. B

SCALE NONE | SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED







FOR PROPER INSTALLATION, IT IS RECOMMENDED TO
MOUNT EQUIPMENT IN A RACK CABINET OR BENCH TOP ENCLOSURE.

IN
(MM)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE :
DEC. XXX ± XX ±
DEC. ± X
THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING

FILE NO. EXTENSION
\2014\04019-.DWG

APPROVALS	DATE
DRAWN TJP	062904
CHECKED	
RELEASED	

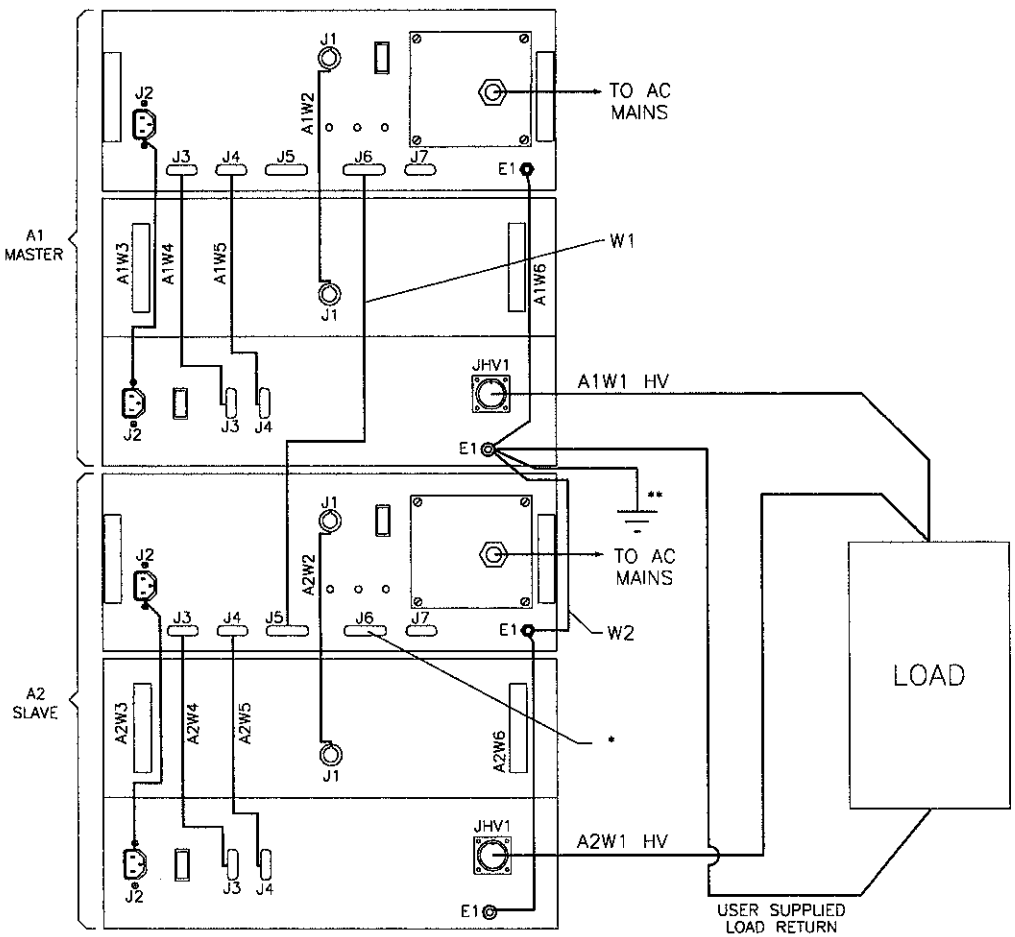
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, N.J. 08829
(908) 638-3000 FAX (908) 638-3700

TITLE OUTLINE & INSTALLATION
SH SERIES
MASTER/SLAVE

D DWG.NO. 201404-019 REV. NR

SCALE NONE SHEET 1 OF 2

REV.	BY	DESCRIPTION	DATE	APPROVED



MASTER

JHV1 – HIGH VOLTAGE OUTPUT
J5 – CUSTOMER INTERFACE
J6 – SLAVE INTERFACE OUTPUT
J7 – OPTION

E1 – LOAD RETURN GROUND

SLAVE

JHV1 – HIGH VOLTAGE OUTPUT
J5 – SLAVE INTERFACE INPUT
J6 – SLAVE INTERFACE OUTPUT
J7 – OPTION

E1 – LOAD RETURN GROUND

NOTES

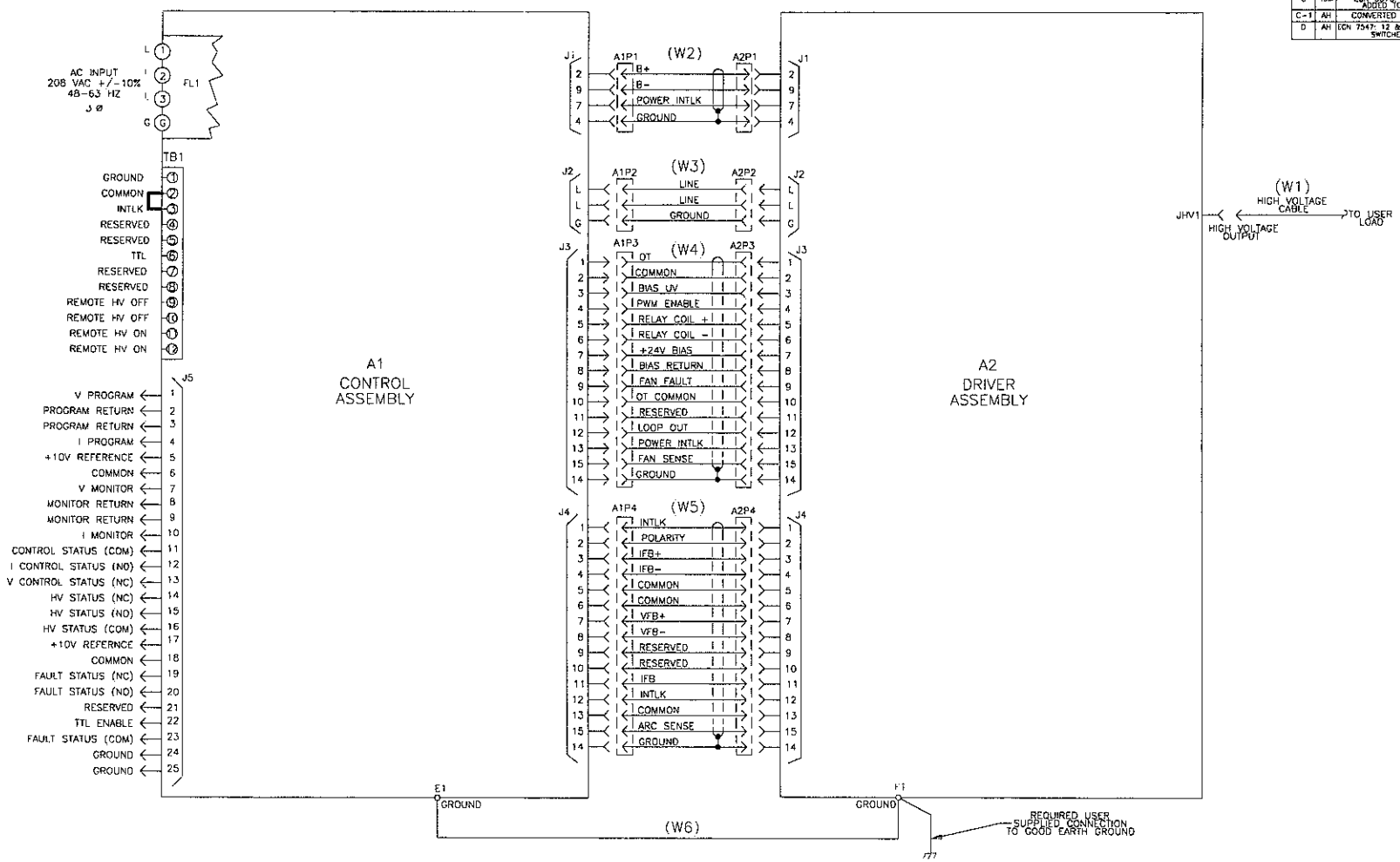
* – J6 OF SLAVE TO BE TERMINATED WITH CONNECTOR PROVIDED.

** – REQUIRED USER SUPPLIED CONNECTION TO GOOD EARTH GROUND.

FOR PROPER INSTALLATION, IT IS RECOMMENDED TO MOUNT EQUIPMENT IN A RACK CABINET OR BENCH TOP ENCLOSURE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \2014\04019-.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
	APPROVALS / DATE	TITLE: OUTLINE & INSTALLATION SH SERIES MASTER/SLAVE
	DRAWN TJP 052904	
THIRD ANGLE PROJECTION	CHECKED	D DWG.NO. 201404-019 REV. NR
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 2 OF 2

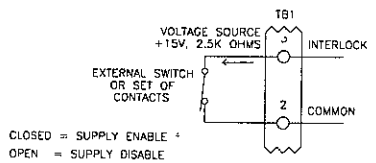
REV	BY	DESCRIPTION	DATE	APPROVED
NR-1	TJM	TYPO CORRECTIONS	042899	JM
NR-2	TJM	TYPO CORRECTIONS	052599	SD
A	TJM	ECN 8260: J5 NOMENCLATURES	061199	EJM
B	TJM	ECN 8598: W2 CONNECTIONS CLARIFIED	061199	EJM
C	TJM	ECN 8875: SHIELD ADDED TO W2	053000	EJM
C-1	AH	CONVERTED TO CAD	032002	JMC
D	AH	ECN 7547: 12 & 13 ON A1 SWITCHED.	091002	



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX ± XX ± DEC. °	FILE NO. EXTENSION \2001\68001D.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700	
USED WITH:	APPROVALS / DATE: DRAWN TJM 031999; CHECKED SD 032499; RELEASED	TITLE: SCHEMATIC DIAGRAM SYSTEM SCHEMATIC PS/SH SERIES	
DO NOT SCALE DRAWING		SIZE D; DWG. NO. 200168-001; REV. D	
		SCALE NONE; SHEET 1 OF 1	

REV	BY	DESCRIPTION	DATE	APPROVED
NR-1	AH	CORRECTED VARIOUS TYPOS.	121200	DAS
NR-2	AH	CONVERTED TO AUTO-CAD	032002	JMC
NR-3	AH	FIXED TYPO	051602	AJCH
A	AH	ECN 7547 FIXED TYPOS	090902	

REMOTE INTERLOCK — FIGURE 1

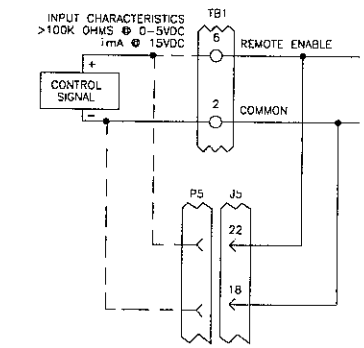


CLOSED = SUPPLY ENABLE *
OPEN = SUPPLY DISABLE

* (REFER TO INSTRUCTION MANUAL TEXT)

REMOTE HV ENABLE — FIGURE 2

(REAR PANEL SWITCH S3 SET TO REMOTE PROGRAMMING ENABLE POSITION IF APPLICABLE)



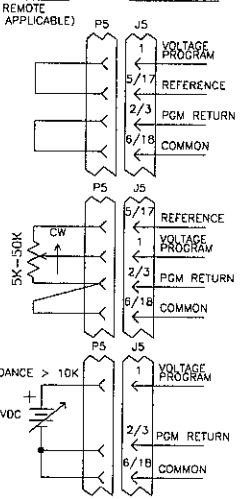
REMOTE VOLTAGE PROGRAM — FIGURE 3

(FRONT PANEL SWITCH SET TO REMOTE PROGRAMMING KV POSITION IF APPLICABLE)

VOLTAGE PROGRAM TO MAXIMUM BY CONNECTING TO REFERENCE TERMINAL AND RETURN TO COMMON

REMOTE VOLTAGE PROGRAMMED BY ATTACHING A 5K TO 50K POTENTIOMETER BETWEEN REFERENCE AND RETURN WITH THE WIPER ARM TO VOLTAGE PROGRAMMING.

THE SUPPLY MAY BE PROGRAMMED WITH A REMOTE 0-10VDC VOLTAGE WHICH IS POSITIVE WITH RESPECT TO PROGRAM RETURN.



VOLTAGE AND CURRENT PROGRAM SIGNALS ARE DIFFERENTIAL WITH PROGRAM RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT PROGRAM RETURN BE CONNECTED TO COMMON AT THE PROGRAM SOURCE. MAXIMUM COMMON MODE IS 3VDC.

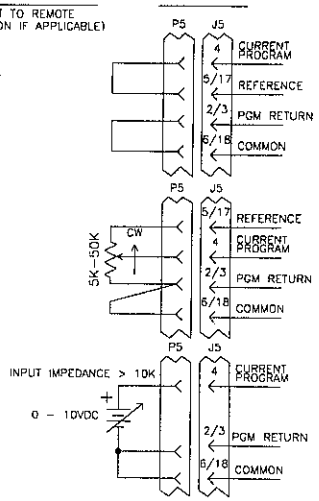
REMOTE CURRENT PROGRAM — FIGURE 4

(FRONT PANEL SWITCH SET TO REMOTE PROGRAMMING MA POSITION IF APPLICABLE)

CURRENT PROGRAM TO MAXIMUM BY CONNECTING TO REFERENCE TERMINAL AND RETURN TO COMMON

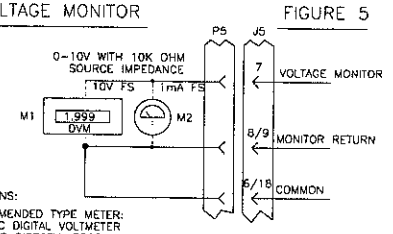
REMOTE CURRENT PROGRAMMED BY ATTACHING A 5K TO 50K POTENTIOMETER BETWEEN REFERENCE AND RETURN WITH THE WIPER ARM TO CURRENT PROGRAMMING.

THE SUPPLY MAY BE PROGRAMMED WITH A REMOTE 0-10VDC VOLTAGE WHICH IS POSITIVE WITH RESPECT TO PROGRAM RETURN.



VOLTAGE AND CURRENT PROGRAM SIGNALS ARE DIFFERENTIAL WITH PROGRAM RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT PROGRAM RETURN BE CONNECTED TO COMMON AT THE PROGRAM SOURCE. MAXIMUM COMMON MODE IS 3VDC.

VOLTAGE MONITOR — FIGURE 5



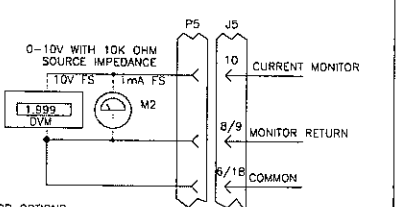
KV MONITOR OPTIONS:

M1 - RECOMMENDED TYPE METER:
0 - 10VDC DIGITAL VOLTMETER
0 - 10V IS DIRECTLY PROPORTIONAL TO 0 - MAX KV RATING

M2 - ALTERNATE TYPE METER:
0 - 1mA FULL SCALE CURRENT METER
0 - 1mA IS DIRECTLY PROPORTIONAL TO 0 - MAX KV RATING

MONITOR SIGNALS ARE DIFFERENTIAL WITH MONITOR RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT THEY BE CONNECTED TO COMMON AT THEIR LOAD. MAXIMUM COMMON MODE IS 3VDC.

CURRENT MONITOR — FIGURE 6



MA MONITOR OPTIONS:

M1 - RECOMMENDED TYPE METER:
0 - 10VDC DIGITAL VOLTMETER
0 - 10V IS DIRECTLY PROPORTIONAL TO 0 - MAX mA RATING

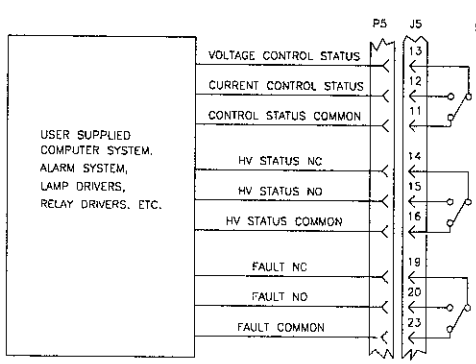
M2 - ALTERNATE TYPE METER:
0 - 1mA FULL SCALE CURRENT METER
0 - 1mA IS DIRECTLY PROPORTIONAL TO 0 - MAX mA RATING

MONITOR SIGNALS ARE DIFFERENTIAL WITH MONITOR RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT THEY BE CONNECTED TO COMMON AT THEIR LOAD. MAXIMUM COMMON MODE IS 3VDC.

STATUS SIGNALS — FIGURE 7

FORM "C" CONTACT RATING:
24VDC AT 1A MAXIMUM

SEE MANUAL FOR COMPLETE DESCRIPTION OF SIGNAL OPERATION



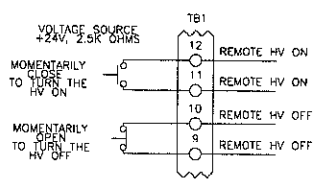
CONDITION	MEANING
DE-ENERGIZED PINS 11 & 13 CONNECTED	VOLTAGE CONTROL MODE
ENERGIZED PINS 11 & 12 CONNECTED	CURRENT CONTROL MODE

CONDITION	MEANING
DE-ENERGIZED PINS 16 & 14 CONNECTED	HV OUTPUT IS INHIBITED
ENERGIZED PINS 16 & 15 CONNECTED	HV OUTPUT IS BEING GENERATED

CONDITION	MEANING
DE-ENERGIZED PINS 23 & 19 CONNECTED	NO FAULT, READY TO GENERATE HV
ENERGIZED PINS 23 & 20 CONNECTED	INTERNAL SYSTEM FAULT, HV OUTPUT IS INHIBITED

EXTERNAL HV ON/OFF — FIGURE 8

(FRONT PANEL SWITCH SET TO REMOTE HV ON/OFF POSITION)



THE SUPPLY MAY BE MADE TO OPERATE SO THAT THE OUTPUT IS PROVIDED UPON TURN ON OF THE AC POWER SWITCH BY JUMPING PINS 11 & 12 TOGETHER AND PINS 9 & 10 TOGETHER. WHEN OPERATED IN THIS MANNER THE HV WILL BE PRESENT IMMEDIATELY UPON CLOSING THE EXTERNAL INTERLOCK.

NOTES:

1. THESE DIAGRAMS ARE PROVIDED AS A SUPPLEMENT TO THE INSTRUCTION MANUAL TEXT, NOT AS A SUBSTITUTE. READ INSTRUCTION MANUAL TEXT CAREFULLY BEFORE MAKING CONNECTIONS.

2. TERMINAL NUMBERS SEPARATED BY A "/", SUCH AS 9/22, MEANS EITHER TERMINAL MAY BE USED FOR THE CONNECTION.

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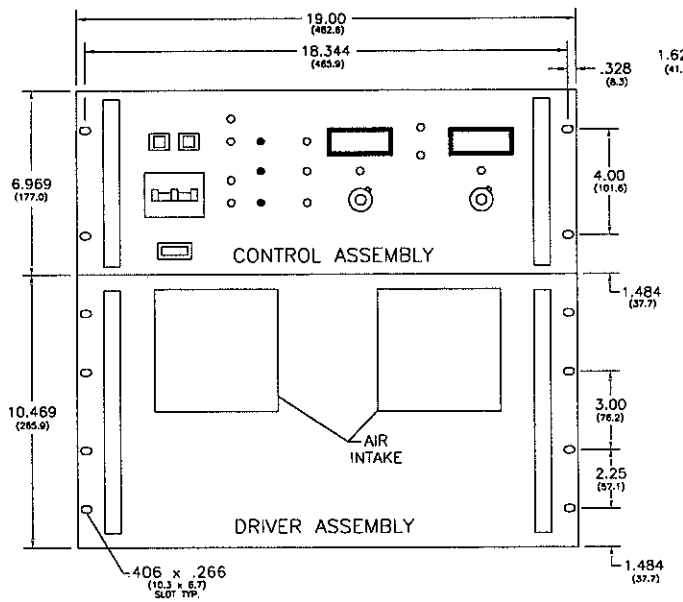
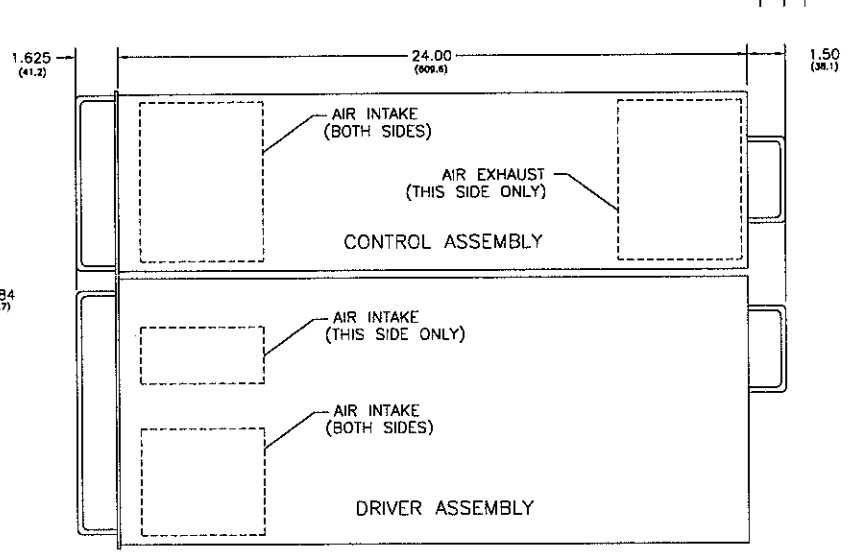
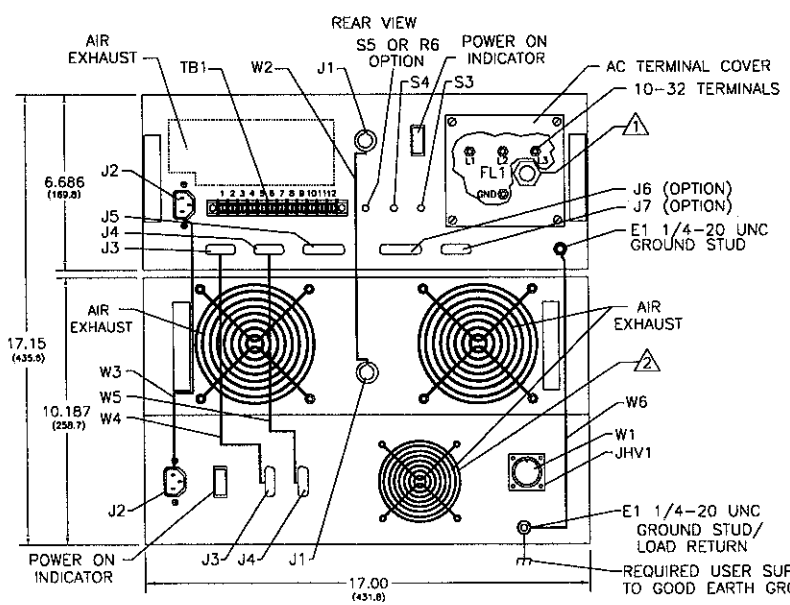
	APPROVALS DATE	TITLE REMOTE CONTROL INTERFACE SH SERIES
MATERIAL	DRAWN IJM 081299	
FINISH	CHECKED SD 081799	D DWG. NO. 200169-001 REV. A
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 1







CONTROL ASSEMBLY

J5 – 1 – V PROGRAM
2 – PROGRAM RETURN
3 – PROGRAM RETURN
4 – I PROGRAM
5 – +10V REFERENCE
6 – COMMON
7 – V MONITOR
8 – MONITOR RETURN
9 – MONITOR RETURN
10 – I MONITOR
11 – CONTROL STATUS (COM)
12 – I CONTROL STATUS (NO)
13 – V CONTROL STATUS (NC)
14 – HV STATUS (NC)
15 – HV STATUS (NO)
16 – HV STATUS (COM)
17 – +10V REFERENCE
18 – COMMON
19 – FAULT STATUS (NC)
20 – FAULT STATUS (NO)
21 – RESERVED
22 – TTL ENABLE
23 – FAULT STATUS (COM)
24 – GROUND
25 – GROUND

TB1 – 1 – GROUND
2 – COMMON
3 – INTERLOCK
4 – RESERVED
5 – RESERVED
6 – TTL ENABLE
7 – RESERVED
8 – RESERVED
9 – REMOTE HV OFF
10 – REMOTE HV OFF
11 – REMOTE HV ON
12 – REMOTE HV ON

J1 – DC POWER INTERFACE
J2 – AC POWER INTERFACE
J3 – INVERTER INFERFACE
J4 – HIGH VOLTAGE INTERFACE

E1 – GROUND STUD

FL1– AC INPUT – 208 VAC
+/– 10%
48–63 HZ
3 PHASE

S3 – TTL LOCAL/REMOTE
S4 – CURRENT LIMIT/TRIP

1 – STRAIN RELIEF FOR .70" – .98" DIA. CORD OR INSULATED WIRE BUNDLE. (SUPPLIED)
PROPER INSULATION/STRAIN RELIEF MUST BE MAINTAINED
THROUGH AC TERMINAL COVER FOR SAFE OPERATION!

2 – FAN GUARD PROVIDED ON >6KV UNITS, AIR HOLES ON 1–6KV UNITS.

DRIVER ASSEMBLY

J1 – DC POWER INTERFACE
J2 – AC POWER INTERFACE
JHV1 – HIGH VOLTAGE OUTPUT CONNECTOR
1–60KV AMPHENOL 83–1R OR EQUIVALENT
70–100KV MS3102A–18 (SHOWN)
E1 – LOAD RETURN GROUND STUD

J3 – INVERTER INTERFACE
J4 – HIGH VOLTAGE INTERFACE

IN
(MM)

NET WEIGHT: 110 lbs. 41 kg.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX ± .XX ± DEC. ± ANGLES ± THIRD ANGLE PROJECTION DO NOT SCALE DRAWING

FILE NO. EXTENSION \2014\04017-.DWG
APPROVALS DATE
DRAWN TJP 062904
CHECKED
RELEASED

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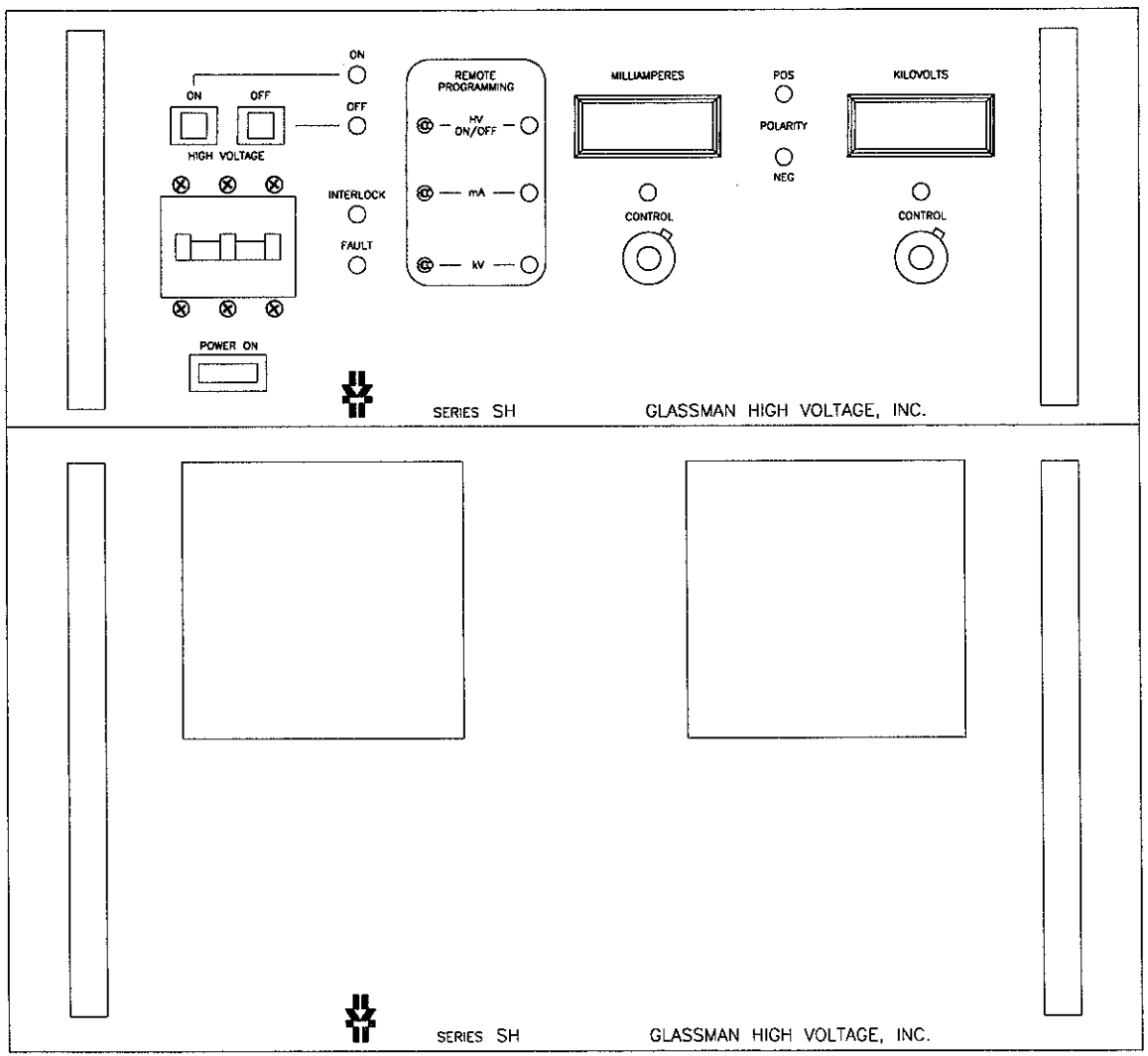
P.O. BOX 312, HIGH BRIDGE, NJ. 08829
(908) 638-2600 FAX (908) 638-3700

TITLE OUTLINE & INSTALLATION
SH SERIES

D DWG NO. 201404-017 REV. NR

SCALE NONE SHEET 1 OF 3

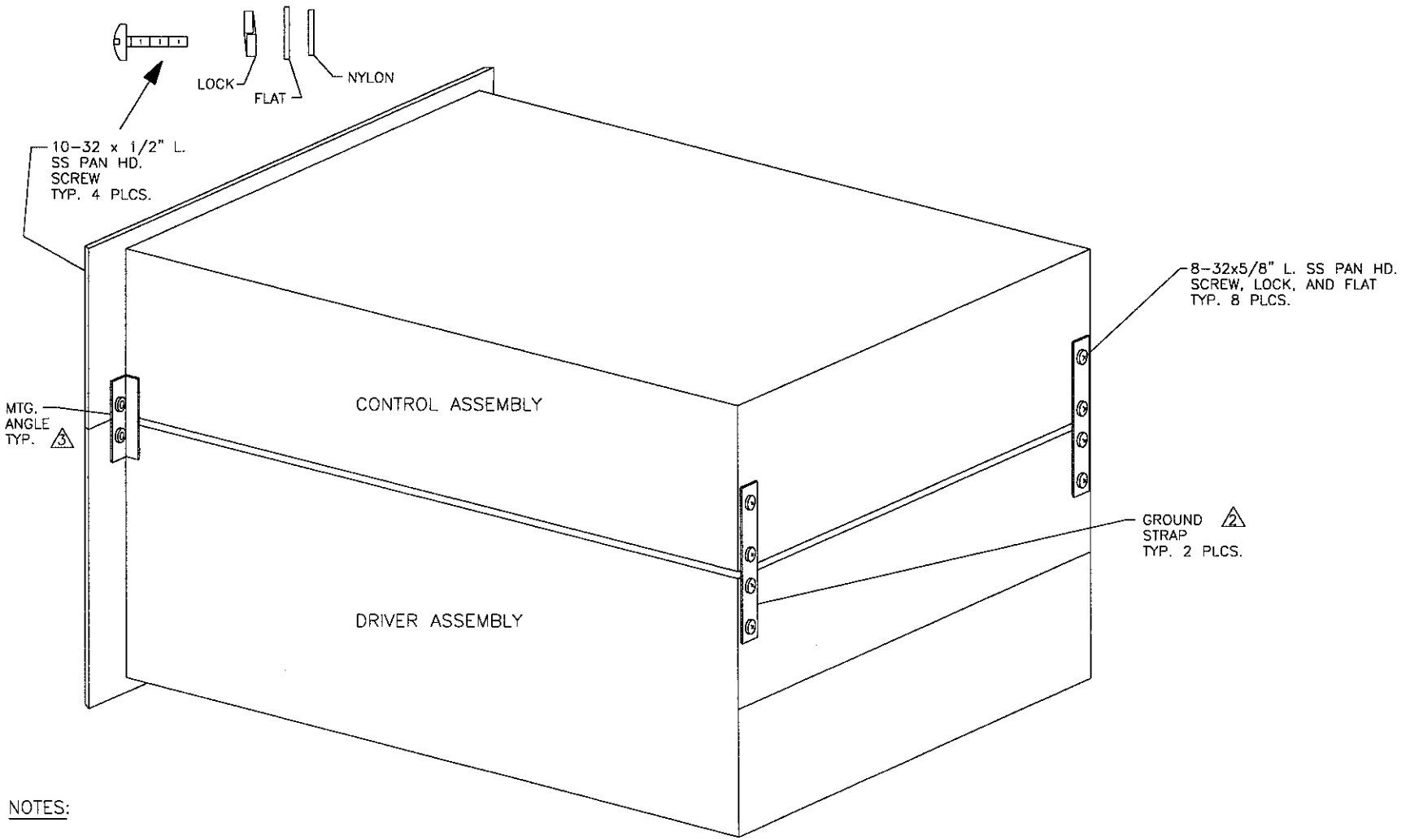
REV	BY	DESCRIPTION	DATE	APPROVED



IN
(MM)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± .XX ± DEG. ± THIRD ANGLE PROJECTION DO NOT SCALE DRAWING	FILE NO. EXTENSION \2014\04017-.DWG APPROVALS DATE DRAWN TJP 062904 CHECKED RELEASED	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700 TITLE OUTLINE & INSTALLATION SH SERIES D DWG.NO. 201404-017 REV. NR SCALE NONE SHEET 2 OF 3

REV	BY	DESCRIPTION	DATE	APPROVED



NOTES:

i – FOR PROPER INSTALLATION IT IS RECOMMENDED TO MOUNT EQUIPMENT IN A RACK CABINET OR BENCH TOP ENCLOSURE.

2 – ATTACH GROUND STRAPS AS SHOWN AND SECURE WITH HARDWARE PROVIDED.

3 – FOR BENCH TOP OPERATION WITHOUT AN ENCLOSURE, ATTACH MOUNTING ANGLES AS SHOWN.

IN
(MM)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE :
DEC. XXX ± XX ±
DEG. ±

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FILE NO. EXTENSION
\2014\04017-.DWG

APPROVALS		DATE
DRAWN	TJP	062904
CHECKED		
RELEASED		

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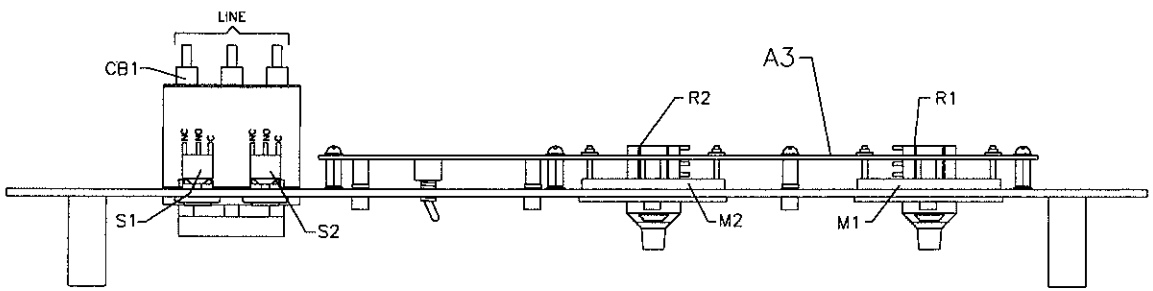
(908) 638-3800 FAX (908) 638-3700

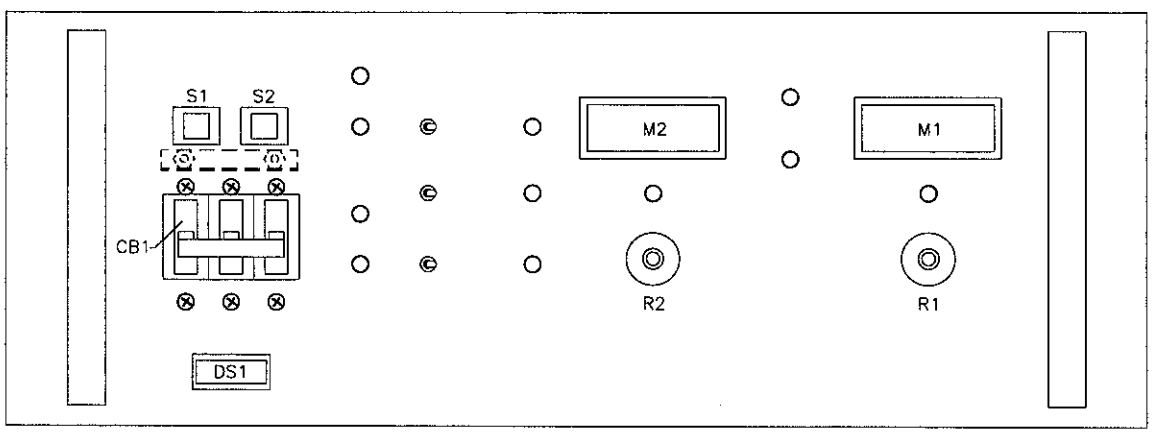
TITLE: OUTLINE & INSTALLATION
SH SERIES

D | DWG NO. 201404-017 | REV. NR

SCALE NONE | SHEET 3 OF 3

REV	BY	DESCRIPTION	DATE	APPROVED
NR-1	TJM	ADDED NOTE 1 & TYPO'S.	042999	JMC
NR-2	AH	UPDATED ADDRESS	061903	[illegible]

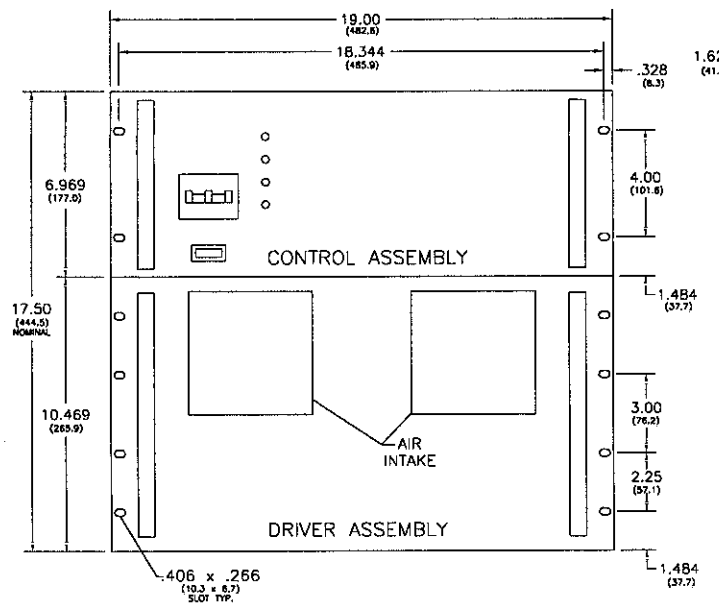


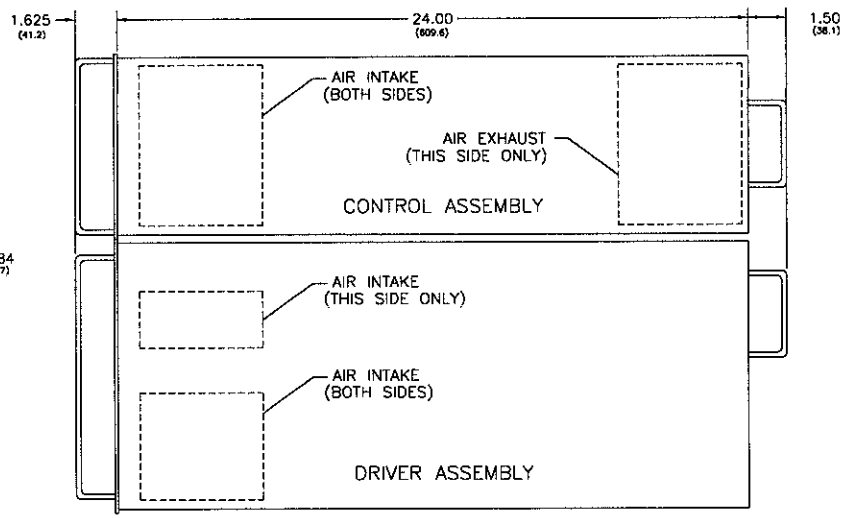


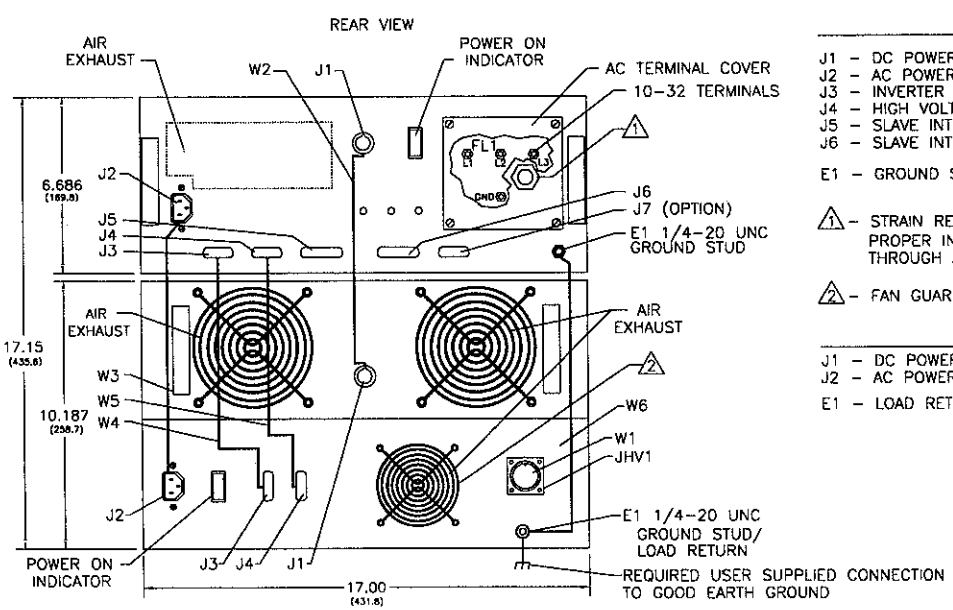
NOTES:

1 – ALL ITEMS SHOWN ARE PREFIXED BY "1".
EXAMPLE: 1M1.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ± THIRD ANGLE PROJECTION DO NOT SCALE DRAWING	FILE NO. EXTENSION \2014\08002-2.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
	APPROVALS DATE	TITLE PARTS PLACEMENT AFP-SH DIGITAL
	DRAWN TJM 032999	
	CHECKED JMC 032999	
	RELEASED	D DWG.NO. 201408-002 REV. NR-2
		SCALE NONE SHEET 1 OF 1







CONTROL ASSEMBLY

J1 – DC POWER INTERFACE
J2 – AC POWER INTERFACE
J3 – INVERTER INFERFACE
J4 – HIGH VOLTAGE INTERFACE
J5 – SLAVE INTERFACE INPUT
J6 – SLAVE INTERFACE OUTPUT

E1 – GROUND STUD

FL1– AC INPUT – 208 VAC
+/– 10%
48–63 HZ
3 PHASE

1 – STRAIN RELIEF FOR .70" – .98" DIA. CORD OR INSULATED WIRE BUNDLE. (SUPPLIED)
PROPER INSULATION/STRAIN RELIEF MUST BE MAINTAINED
THROUGH AC TERMINAL COVER FOR SAFE OPERATION!

2 – FAN GUARD PROVIDED ON >6KV UNITS, AIR HOLES ON 1–6KV UNITS.

DRIVER ASSEMBLY

J1 – DC POWER INTERFACE
J2 – AC POWER INTERFACE

E1 – LOAD RETURN GROUND STUD

J3 – INVERTER INTERFACE
J4 – HIGH VOLTAGE INTERFACE
JHV1 – HIGH VOLTAGE OUTPUT CONNECTOR
1–60KV AMPHENOL 83–1R OR EQUIVALENT
70–100KV MS3102A–18 (SHOWN)

NET WEIGHT: 110 lbs. 41 kg. (IN / (MM))

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACT ± DEC .XXX ± .XX ± DEC .X ± ANGLES ± THIRD ANGLE PROJECTION DO NOT SCALE DRAWING

FILE NO. EXTENSION \2014\04018-.DWG

APPROVALS DATE
DRAWN TJP 082904
CHECKED
RELEASED

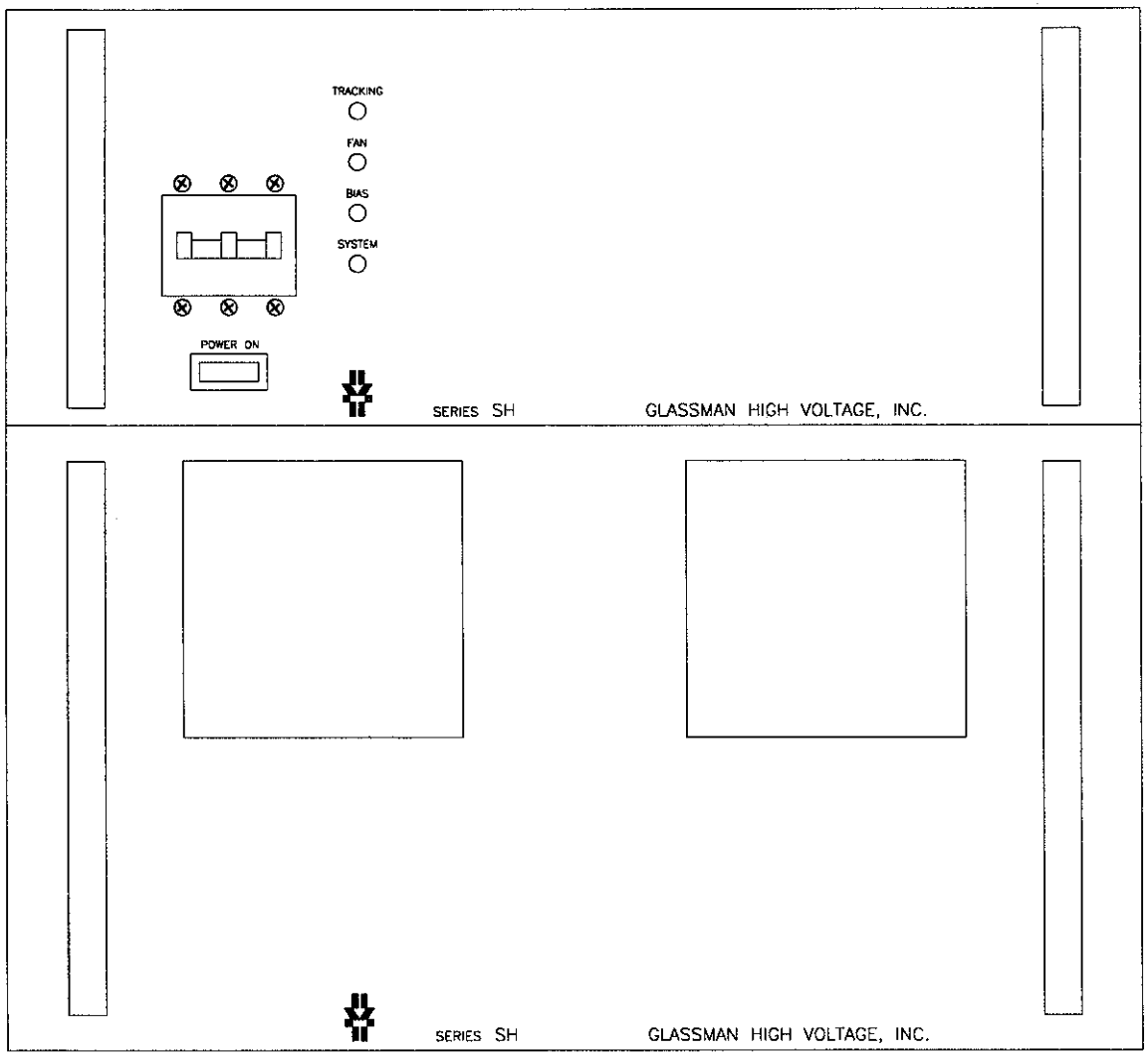
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, N.J. 08829
(908) 638-3600 FAX (908) 638-3700

TITLE OUTLINE & INSTALLATION
SH SERIES
SLAVE

SIZE D DWG NO. 201404-018 REV. NR

SCALE NONE SHEET 1 OF 3

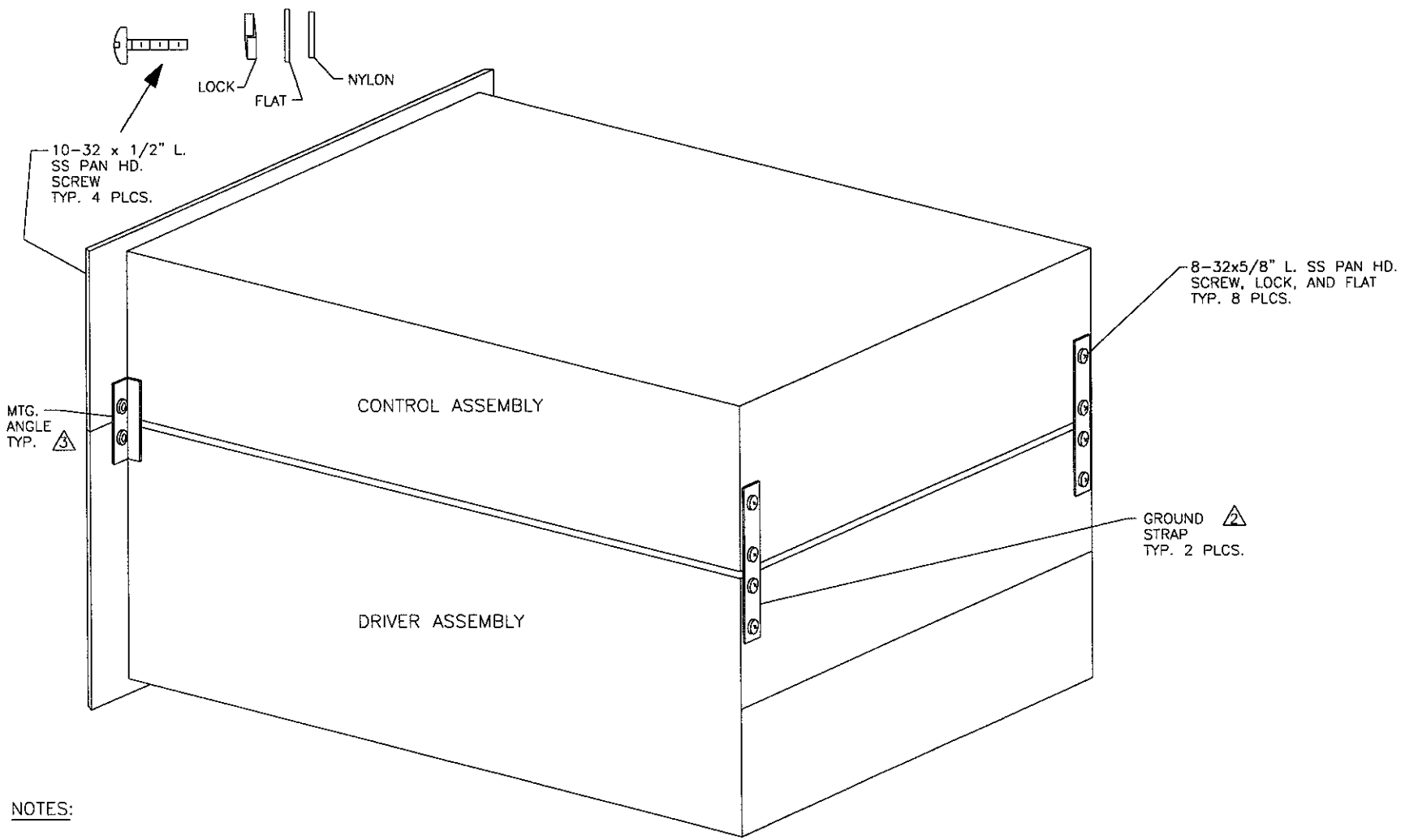
REV	BY	DESCRIPTION	DATE	APPROVED



IN
(MM)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ± THIRD ANGLE PROJECTION DO NOT SCALE DRAWING	FILE NO. EXTENSION \2014\04018-.DWG APPROVALS DATE DRAWN TJP 082904 CHECKED RELEASED	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700 TITLE OUTLINE & INSTALLATION SH SERIES SLAVE D DWG.NO. 201404-018 REV. NR SCALE NONE SHEET 2 OF 3

REV	BY	DESCRIPTION	DATE	APPROVED



NOTES:

1 – FOR PROPER INSTALLATION IT IS RECOMMENDED TO MOUNT EQUIPMENT IN A RACK CABINET OR BENCH TOP ENCLOSURE.

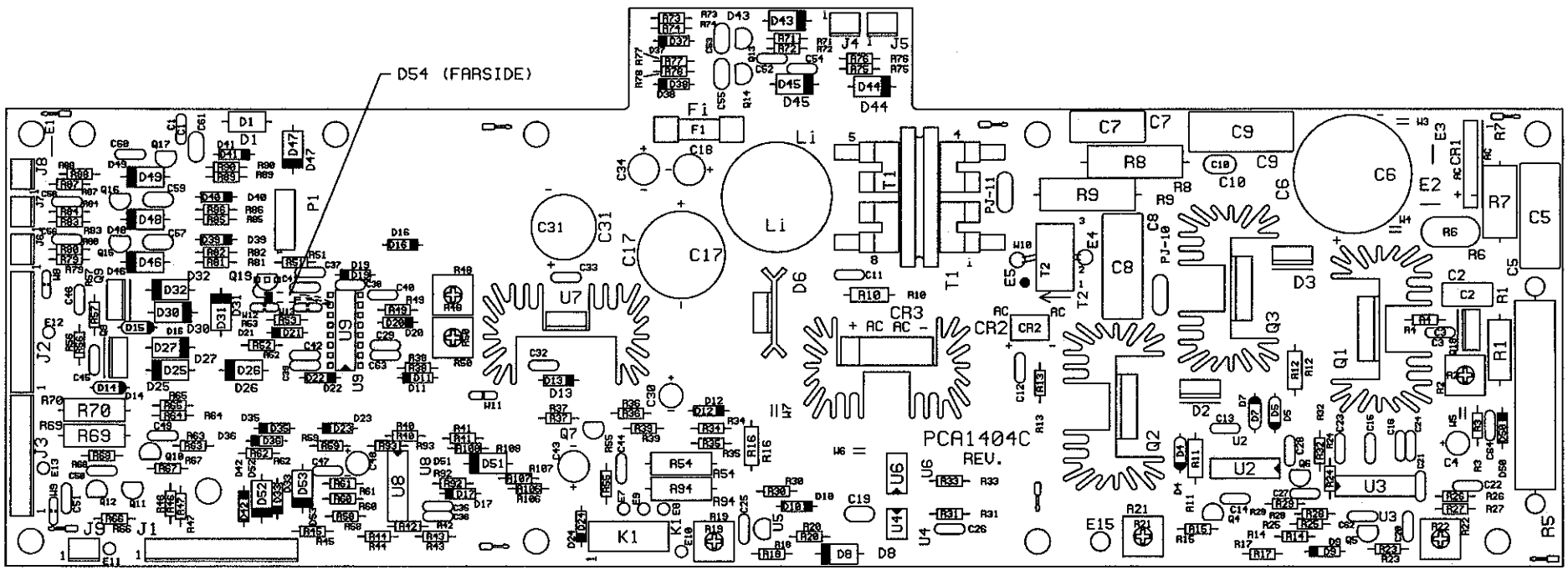
2 – ATTACH GROUND STRAPS AS SHOWN AND SECURE WITH HARDWARE PROVIDED.

3 – FOR BENCH TOP OPERATION WITHOUT AN ENCLOSURE, ATTACH MOUNTING ANGLES AS SHOWN.

IN
(MM)

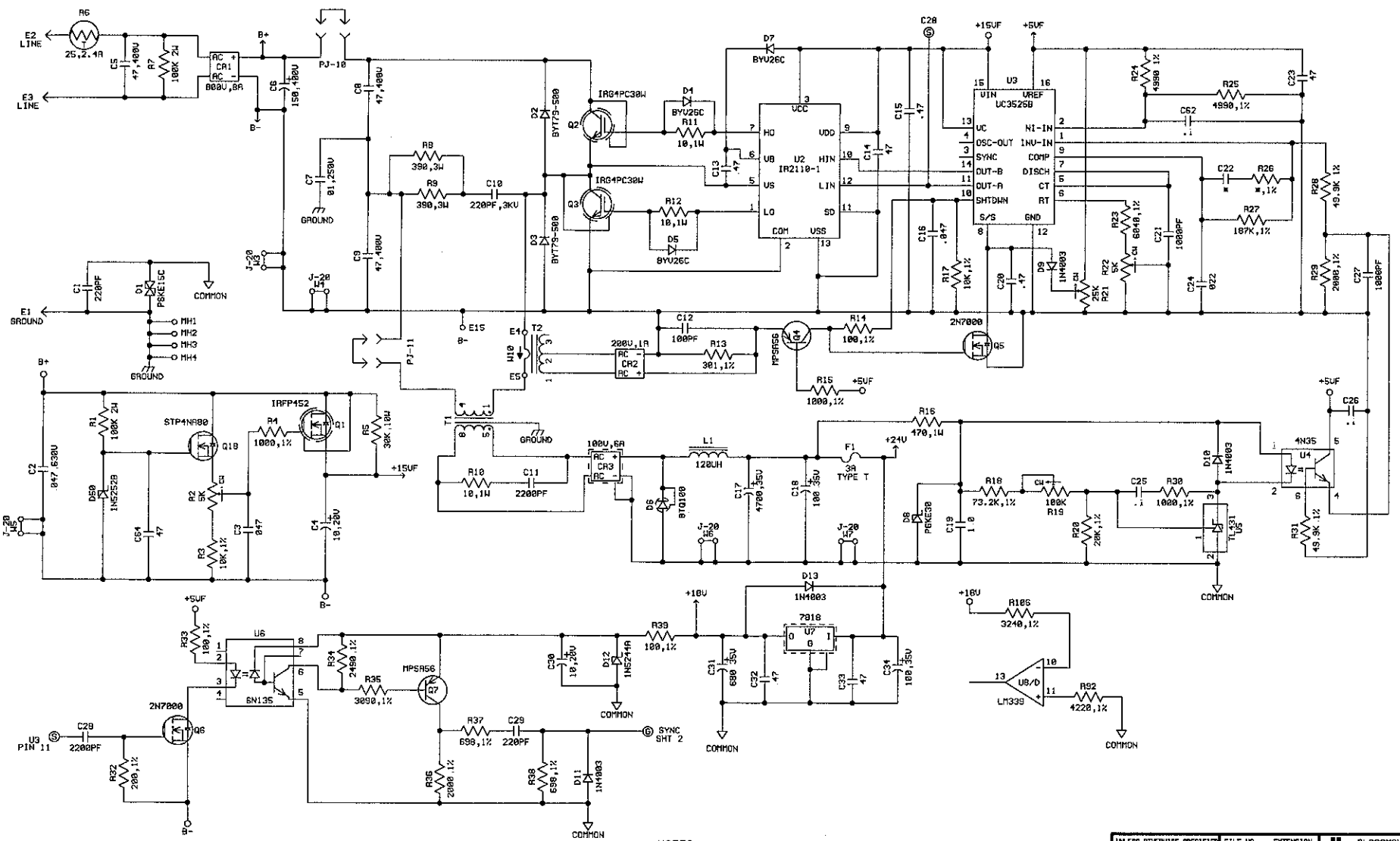
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \2014\04018-.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
THIRD ANGLE PROJECTION	APPROVALS / DATE: DRAWN TJP 062904; CHECKED; RELEASED	TITLE: OUTLINE & INSTALLATION SH SERIES SLAVE
DO NOT SCALE DRAWING		D DWG NO. 201404-018 REV. NR
		SCALE NONE SHEET 3 OF 3

REV	BY	DESCRIPTION	DATE	APPROVED
A	JAG	ECN 8523: ADDED D54	122205	



REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \PCA1\404012A.PCB	GLASSMAN HIGH VOLTAGE, INC P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700
	APPROVALS DATE	TITLE PARTS PLACEMENT
	DRAWN JHK 062005	ABD-SH-03
	CHECKED JMC 062205	B DWG.NO. PCA1404-012 REV. A
THIRD ANGLE PROJECTION	RELEASED	
DO NOT SCALE DRAWING	SSF	SCALE NONE SHEET 1 OF 1

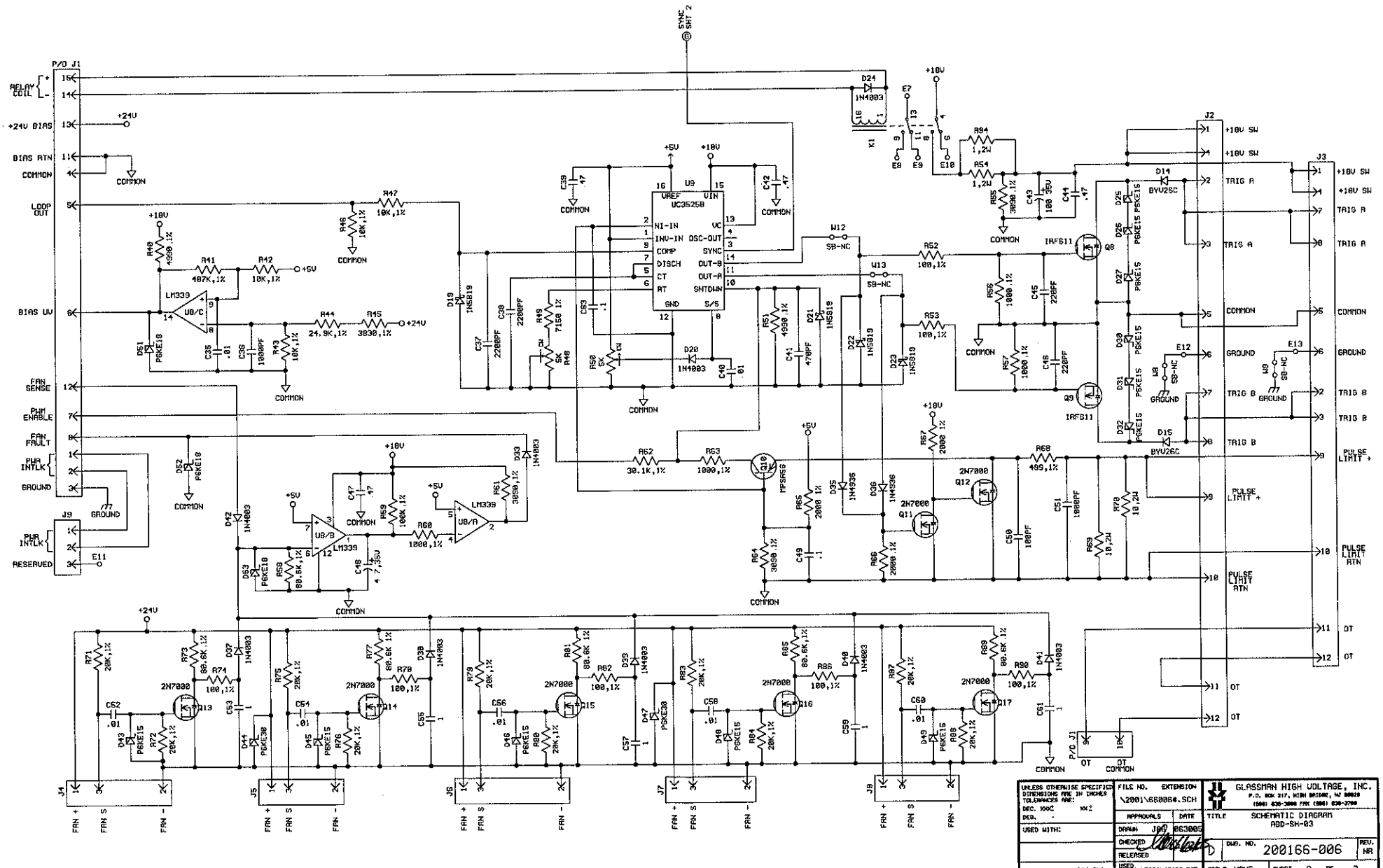


REV	BY	DESCRIPTION	DATE	APPROVED

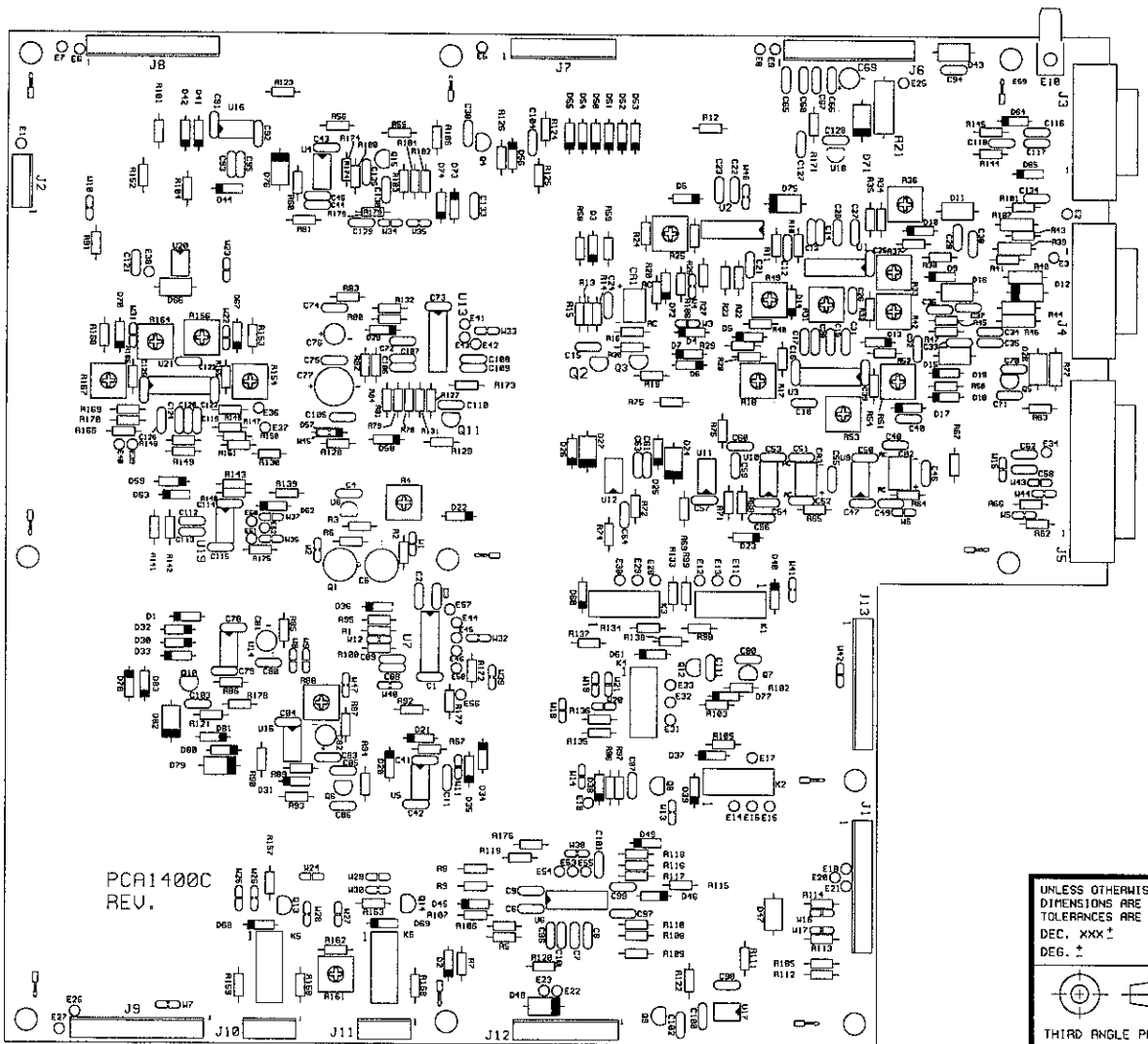
NOTES

1. UNLESS OTHERWISE SPECIFIED:
   a) ALL CAPACITORS ARE IN uF.
   b) ALL POTENTIOMETERS ARE 1/2W, 10%
2. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
3. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXXC ±; DEG. ±; USED WITH:	FILE NO. EXTENSION \2001\66006#.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, NJ 08829 (908) 638-3000 FAX (908) 638-3700
	APPROVALS DATE	TITLE SCHEMATIC DIAGRAM ABD-SH-03
	DRAWN JBG 063005	
	CHECKED	D DWG. NO. 200166-006 REV. NA
DO NOT SCALE DRAWING	RELEASED	
	USED WITH: \PCB\1404C8.PCB	SCALE NONE SHEET 1 OF 2



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \2001\650086.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, NJ 08829 (908) 638-3000 FAX (908) 638-2700	
USED WITH:	APPROVALS / DATE DRAWN JPG 06/30/05 CHECKED RELEASED	TITLE SCHEMATIC DIAGRAM ABD-SH-03	
DO NOT SCALE DRAWING	NEED PATH: \PCB\104C8.PCB	D DWG. NO. 200166-006 REV. NR	
		SCALE NONE	SHEET 2 OF 2



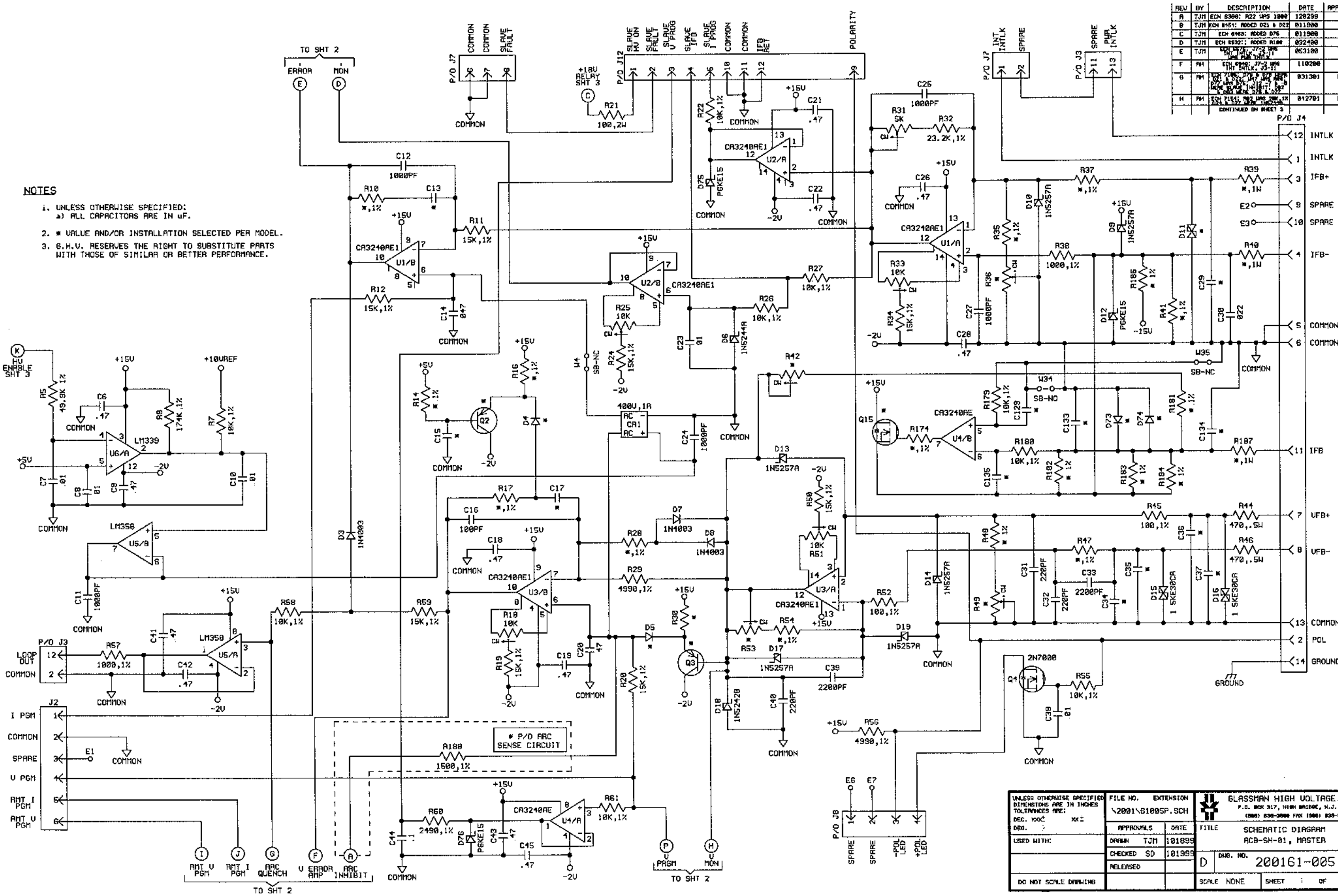
REV	BY	DESCRIPTION	DATE	APPROVED

REDUCED ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \PCA1\400009#.PCB	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700
	APPROVALS DATE	TITLE PARTS PLACEMENT ACB-SH-i (PCA1400C)
	DRAWN TJM 070803	
	CHECKED JAL 071603	B DWG.NO. PCA1400-009 REV. NR
THIRD ANGLE PROJECTION	RELEASED	
DO NOT SCALE DRAWING	SSF	SCALE NONE SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6300: R22 WAS 1000	120299	JM
B	TJM	ECN 8151: ADDED D21 & D22	011800	JM
C	TJM	ECN 6465: ADDED D75	011900	JM
D	TJM	ECN 6532: ADDED R186	032400	SD
E	TJM	[illegible]	053100	JM
F	AH	ECN 6940: J7-2 WAS INT INTLK, J3-11	110200	JM
G	AH	[illegible]	031301	DAS
H	AH	[illegible]	042701	DWS

CONTINUED ON SHEET 3

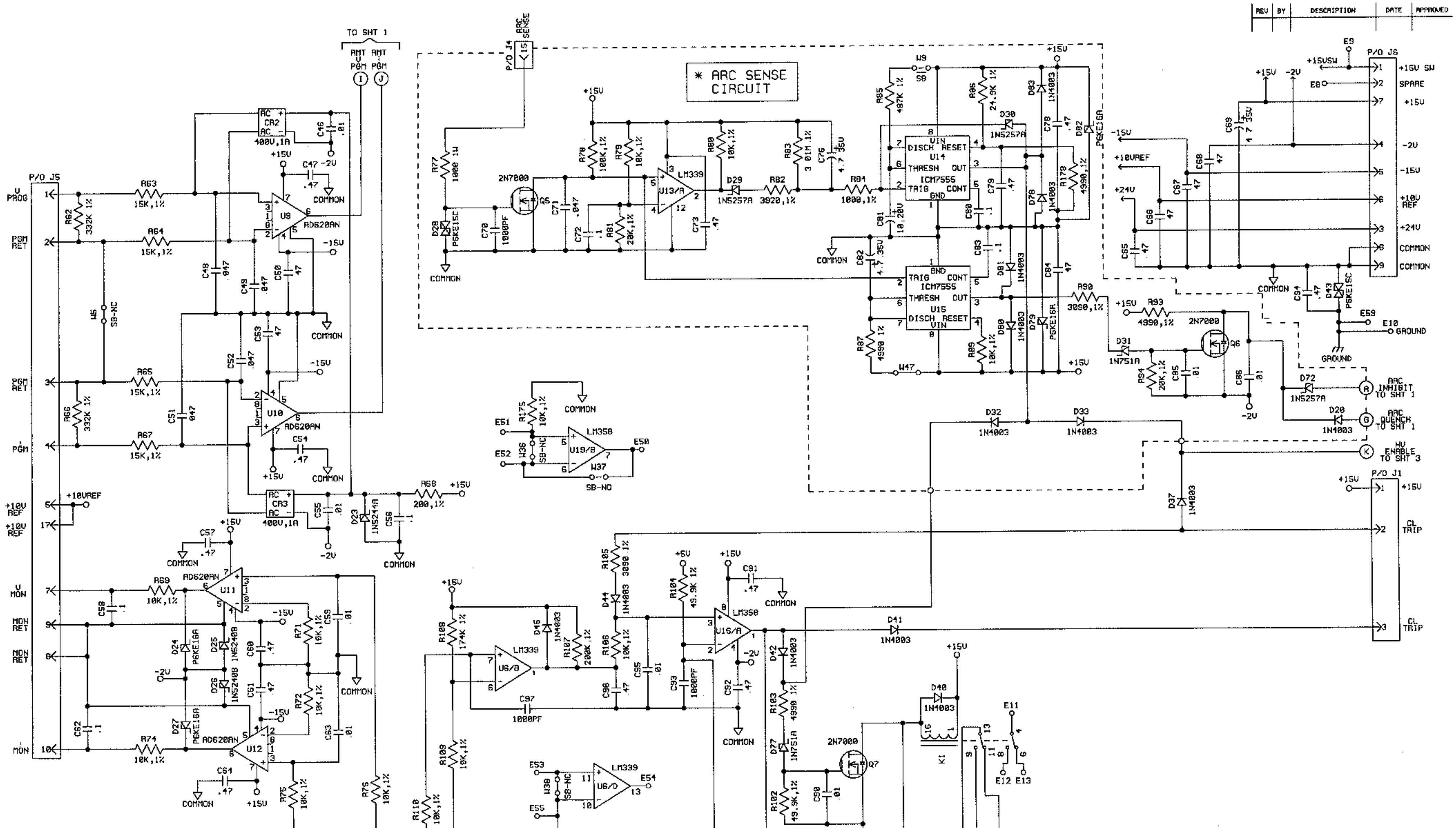


TO SHT 2
ERROR
MON
P/O J7
COMMON
COMMON
SLAVE FAULT
+18V RELAY SHT 3
P/O J12
SLAVE HV ON
SLAVE FAULT
SLAVE V PROG
SLAVE IFB
SLAVE I PROG
COMMON
COMMON
IFB RET
POLARITY
INT INTLK
SPARE
PWR INTLK
P/O J3
P/O J4
INTLK
IFB+
SPARE
IFB-
COMMON
IFB
VFB+
VFB-
POL
GROUND
HV ENABLE SHT 3
LM339
U6/A
+10VREF
LM358
U5/B
U5/A
CA3240AE1
U1/B
U2/B
U3/B
U2/A
U1/A
U3/A
CA3240AE
U4/B
U4/A
400V,1A
CA1
W4
SB-NC
W34
SB-NO
W35
2N7000
Q4
Q15
Q2
Q3
P/O J3
LOOP OUT
COMMON
J2
I PGM
COMMON
SPARE
V PGM
RMT I PGM
RMT V PGM
E1
* P/O ARC SENSE CIRCUIT
R188 1500,1%
RMT V PGM
RMT I PGM
ARC QUENCH
V ERROR AMP
ARC INHIBIT
TO SHT 2
PRGM
MON
P/O J8
SPARE
SPARE
-POL LED
+POL LED
E6
E7

NOTES

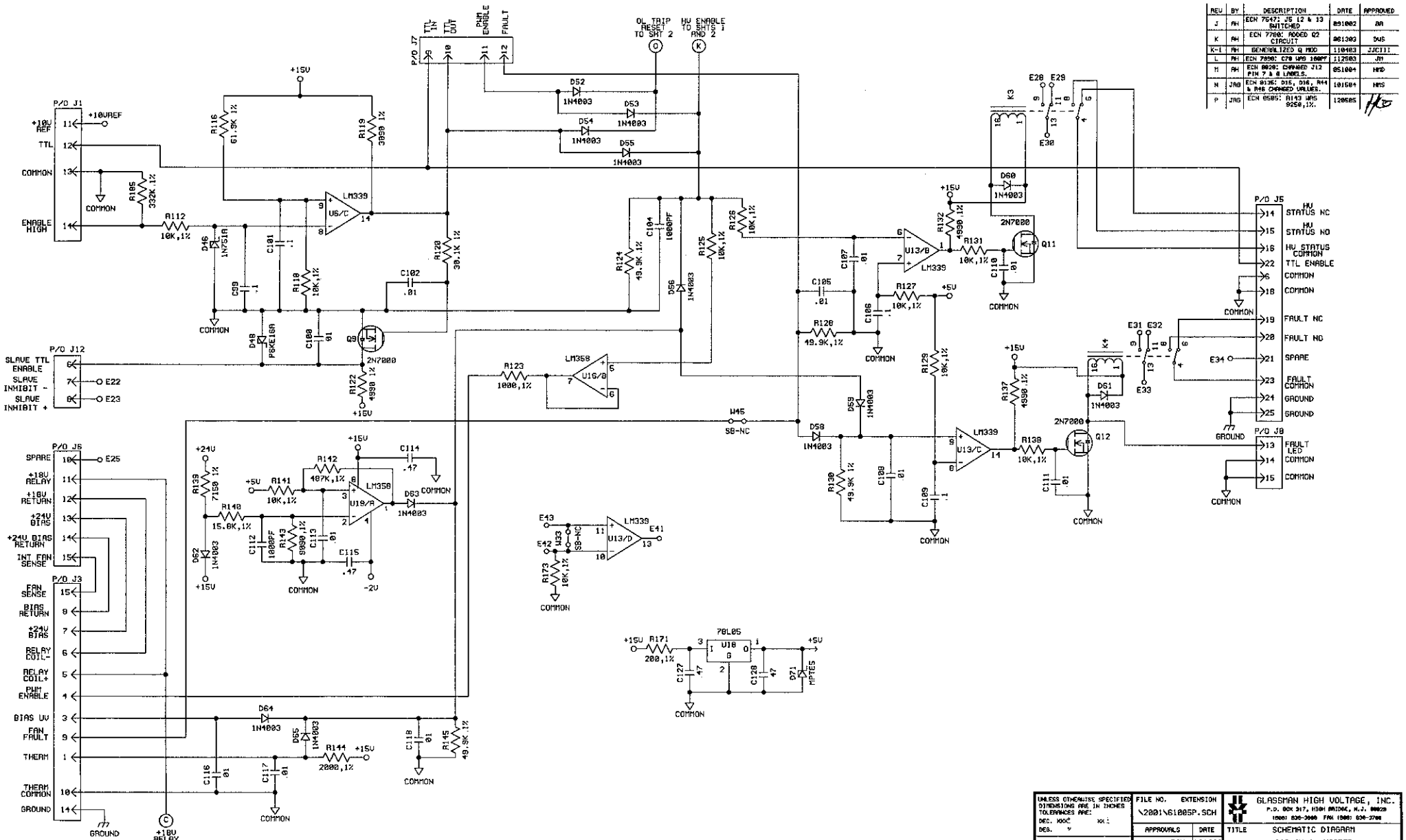
1. UNLESS OTHERWISE SPECIFIED:
   a) ALL CAPACITORS ARE IN uF.
2. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
3. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. .XXX± .XX± DEG. ±	FILE NO. EXTENSION \2001\61005P.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700	
USED WITH:	APPROVALS / DATE; DRAWN TJM 101899; CHECKED SD 101999; RELEASED	TITLE: SCHEMATIC DIAGRAM ACB-SH-01, MASTER	
DO NOT SCALE DRAWING		D DWG. NO. 200161-005	REV. P
		SCALE NONE	SHEET 1 OF 3



REV
BY
DESCRIPTION
DATE
APPROVED
* ARC SENSE CIRCUIT
TO SHT 1
AMT PGM
P/O J4
ARC SENSE
P/O J5
V PROG
PGM RET
PGM RET
PGM
+10V REF
+10V REF
V MON
MON RET
MON RET
MON
+10VREF
U9
AD620AN
U10
AD620AN
U11
AD620AN
U12
AD620AN
CR2
400V,1A
CR3
400V,1A
U13/A
LM339
U14
ICM7555
U15
ICM7555
U19/B
LM358
U16/A
LM358
U6/B
LM339
U6/D
LM339
Q5
2N7000
Q6
2N7000
Q7
2N7000
K1
P/O J6
+15V SW
SPARE
+15V
-2V
-15V
+10V REF
+24V
COMMON
COMMON
E9
+15VSW
E8
E10
GROUND
E59
ARC INHIBIT TO SHT 1
ARC QUENCH TO SHT 1
HV ENABLE TO SHT 3
P/O J1
+15V
CL TRIP
CL TRIP
OL TRIP RESET TO SHT 3
P/O J8
METER COMMON
I METER
V METER
V MON
I MON
ERROR AMP
ERROR AMP
TO SHT 1
P/O J8
V MODE LED
I MODE LED
P/O J5
CONT COMMON
I CONT
V CONT
E11
E12
E13
E50
E51
E52
E53
E54
E55

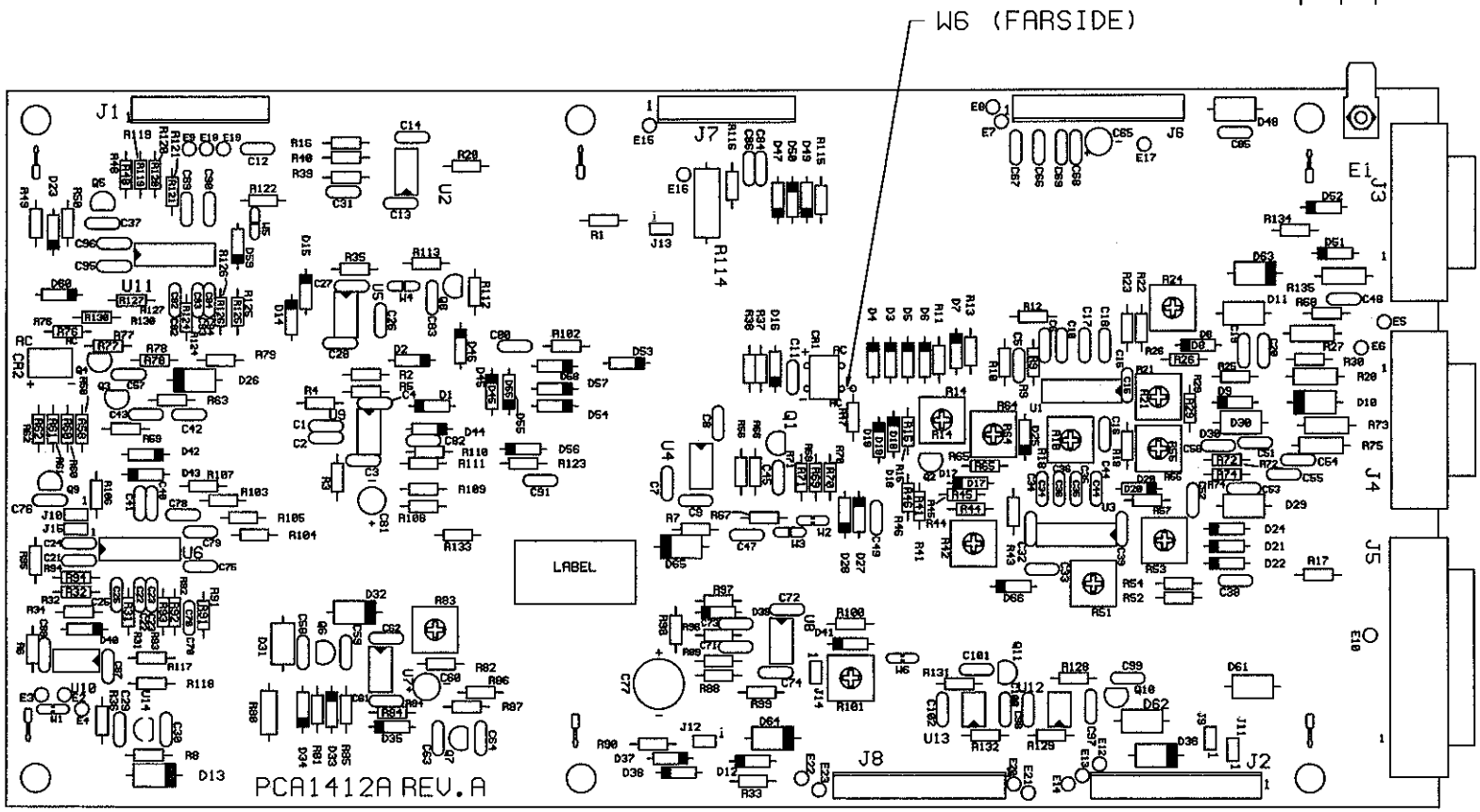
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. .XXX ± DEC. .XX ±	FILE NO. \2001\61005P.SCH	EXTENSION	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700	
	APPROVALS	DATE	TITLE SCHEMATIC DIAGRAM ACB-SH-1, MASTER	
USED WITH:	DRAWN TJM	101899		
	CHECKED SD	101999	D DWG. NO. 200161-005	REV. P
	RELEASED			
DO NOT SCALE DRAWING			SCALE NONE	SHEET 2 OF 3



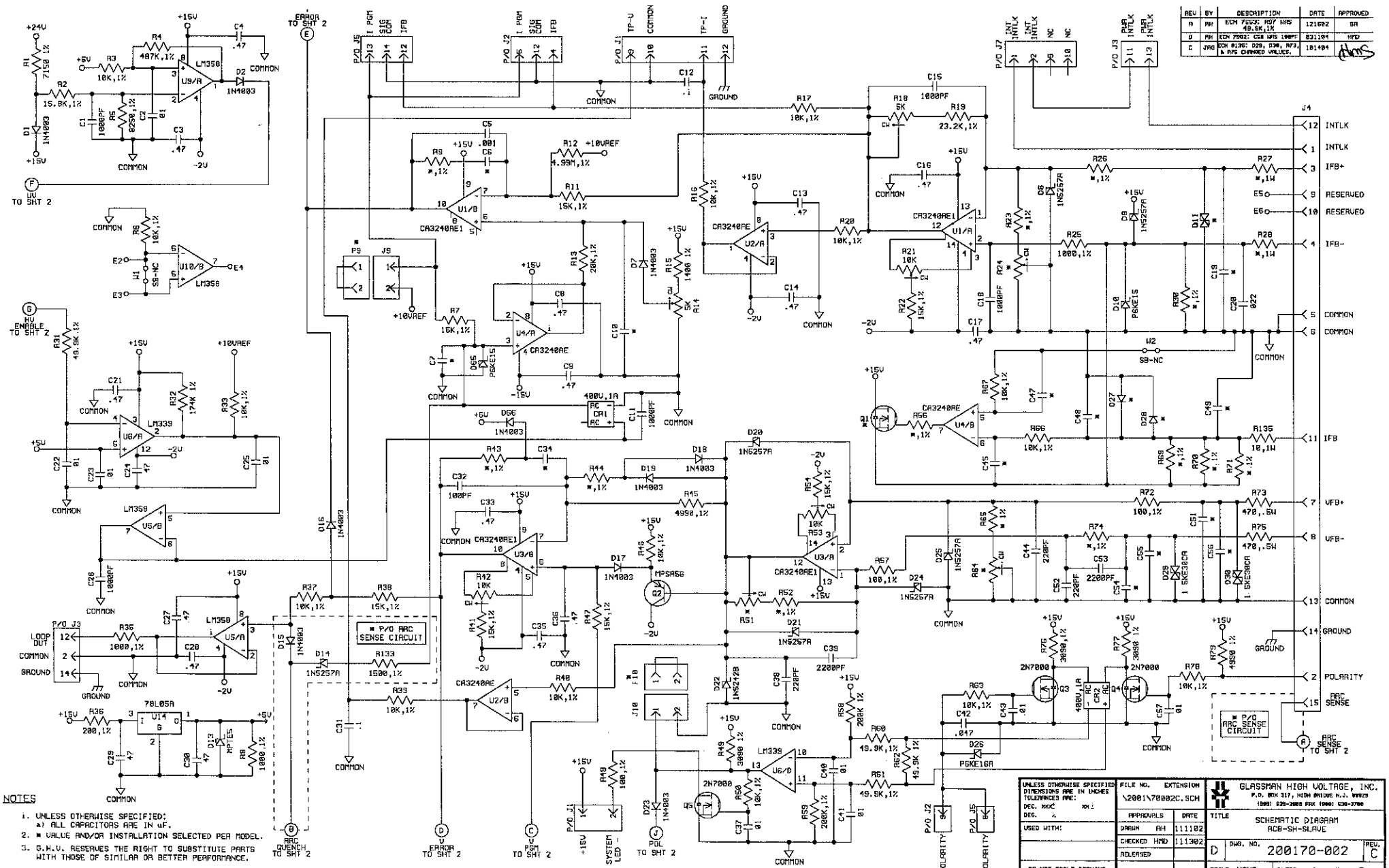
REV	BY	DESCRIPTION	DATE	APPROVED
J	RH	ECN 7547: J5 12 & 13 SWITCHED	051002	BR
K	RH	ECN 7780: ADDED Q2 CIRCUIT	061303	DVS
K-1	RH	GENERALIZED Q MOD	110403	JJC111
L	RH	ECN 7850: C70 WAS 100PF	112503	JH
M	RH	ECN 8020: CHANGED J12 PIN 7 & 8 LABELS.	051004	MHD
N	JAB	ECN 8136: D15, D16, R44 & R46 CHANGED VALUES.	101504	MHS
P	JAB	ECN 8585: R143 WAS 9250,1%.	120505	

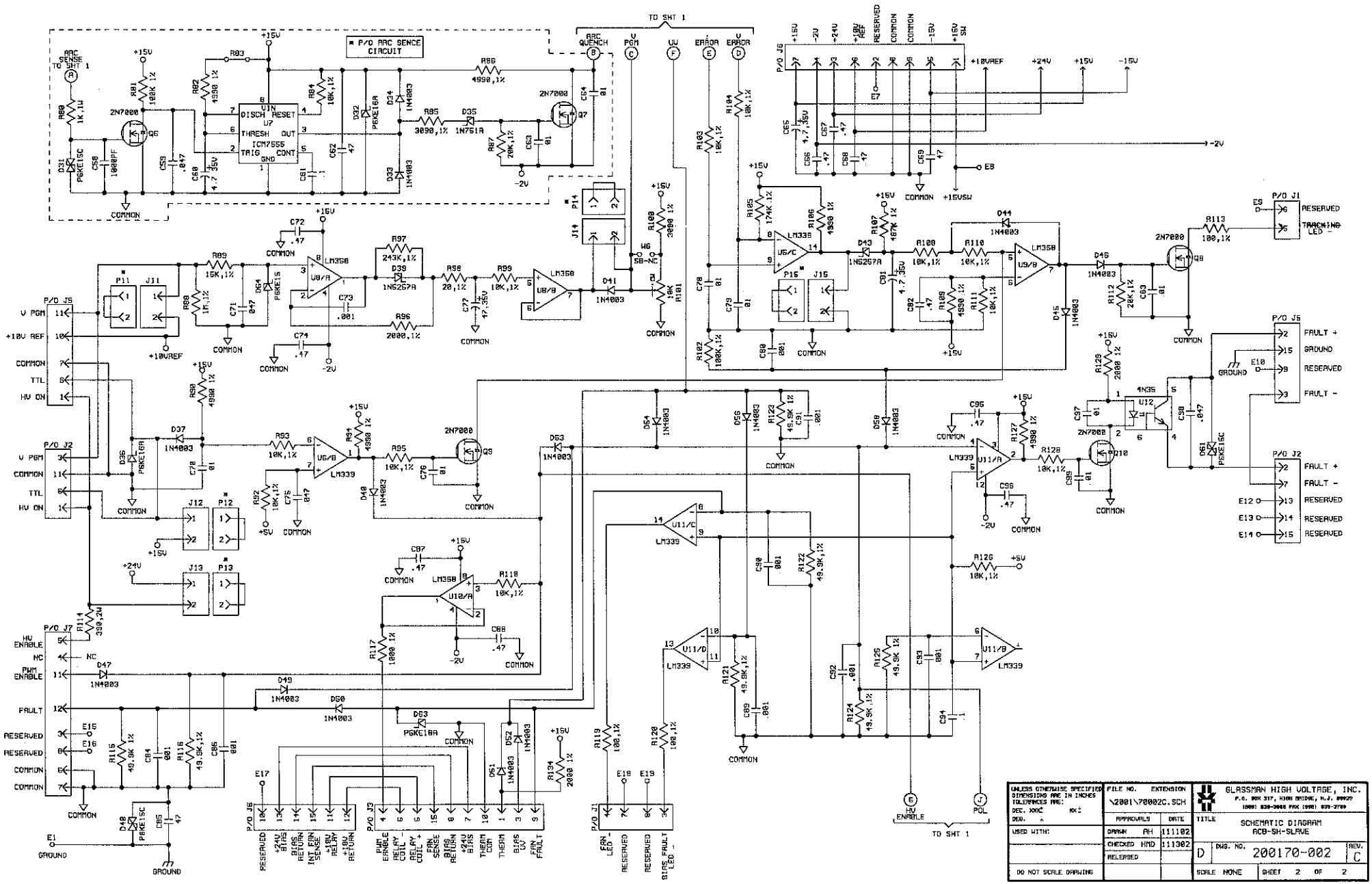
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. °	FILE NO. EXTENSION \2001\61805P.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3788	
	APPROVALS DATE	TITLE SCHEMATIC DIAGRAM	
USED WITH:	DRAWN TJH 101895	ACB-SH-1, MASTER	
	CHECKED SD 101995	D DWG. NO. 200161-005	REV. P
DO NOT SCALE DRAWING	RELEASED	SCALE NONE	SHEET 3 OF 3

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6973: ADDED R135 & REMOVED C46 & C58	112000	JMC
B	JAG	ECN 8523: ADDED W6	121905	



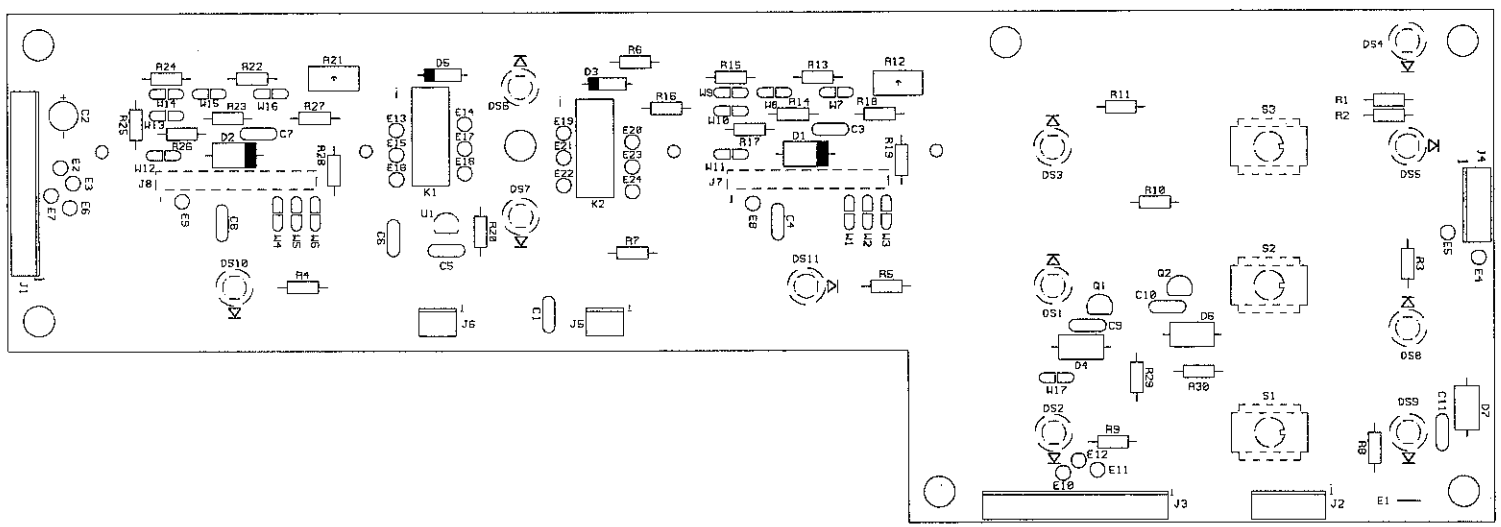
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \PCA1\412004B.PCB	GLASSMAN HIGH VOLTAGE, INC P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700
THIRD ANGLE PROJECTION	APPROVALS / DATE: DRAWN JHK 062000; CHECKED JMC 062000; RELEASED	TITLE: PARTS PLACEMENT ACB-SH-SLAVE
DO NOT SCALE DRAWING	SSF	B · DWG.NO. PCA1412-004 · REV. B
		SCALE NONE · SHEET 1 OF 1


REV | BY | DESCRIPTION | DATE | APPROVED
A | AH | ECN 7553: R57 WAS 49.9K,1% | 121602 | BR
B | AH | ECN 7982: C58 WAS 1000PF | 031104 | MPD
C | JAG | ECN 8136: D20, D26, R73, & R75 CHANGED VALUES. | 101404
NOTES
1. UNLESS OTHERWISE SPECIFIED:
a) ALL CAPACITORS ARE IN uF.
2. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
3. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FILE NO. EXTENSION
\2001\70002C.SCH
APPROVALS DATE
DRAWN AH 111102
CHECKED MMD 111302
RELEASED
DO NOT SCALE DRAWING
GLASSMAN HIGH VOLTAGE, INC.
TITLE SCHEMATIC DIAGRAM ACB-SH-SLAVE
D DWG. NO. 200170-002 REV. C
SCALE NONE SHEET 1 OF 2



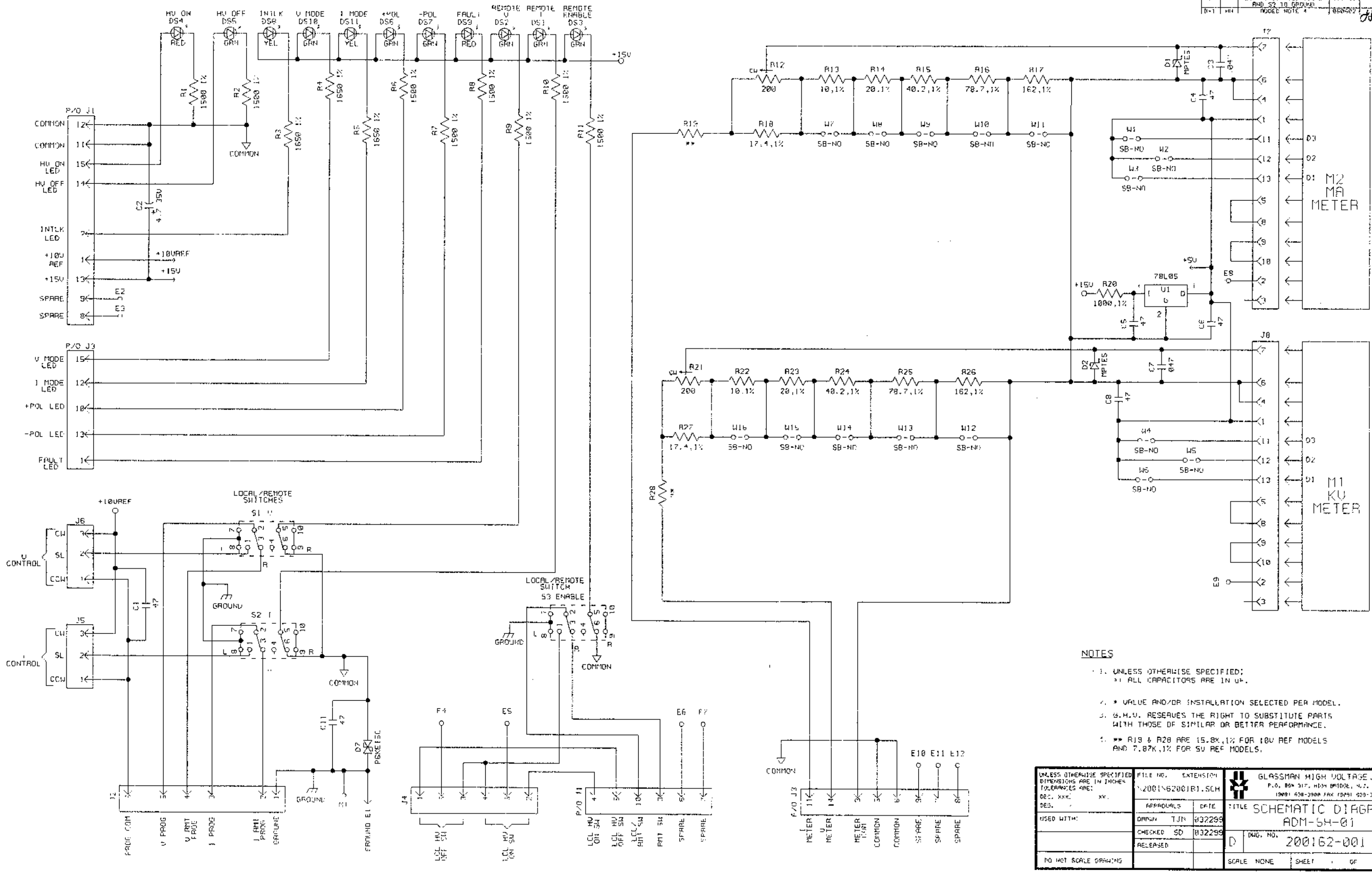
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \2001\70002C.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-2799	
	APPROVALS / DATE	TITLE	SCHEMATIC DIAGRAM ACB-SH-SLAVE
USED WITH:	DRAWN AH 111102		
	CHECKED HND 111302	D	DWG. NO. 200170-002 REV. C
	RELEASED		
DO NOT SCALE DRAWING		SCALE NONE	SHEET 2 OF 2

REV	BY	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \PCA1\402002#.PCB	GLASSMAN HIGH VOLTAGE, INC P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672
THIRD ANGLE PROJECTION	APPROVALS / DATE DRAWN TJM 031999 CHECKED JHL 032299 RELEASED	TITLE: PARTS PLACEMENT DWG. ADM-SH-01
DO NOT SCALE DRAWING	SSF	B / DWG.NO. PCA1402-002 / REV. NR
		SCALE NONE / SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
NR-1	TJM	TYPO 5	052699	SD
A	TJM	ECN 5260; NOTES ADDED	081199	JH
B	HH	ECN 7149; TIED S1, S2 AND S3 TO GROUND	051401	HHC
B-1	HH	ADDED NOTE 4	050502	JHG

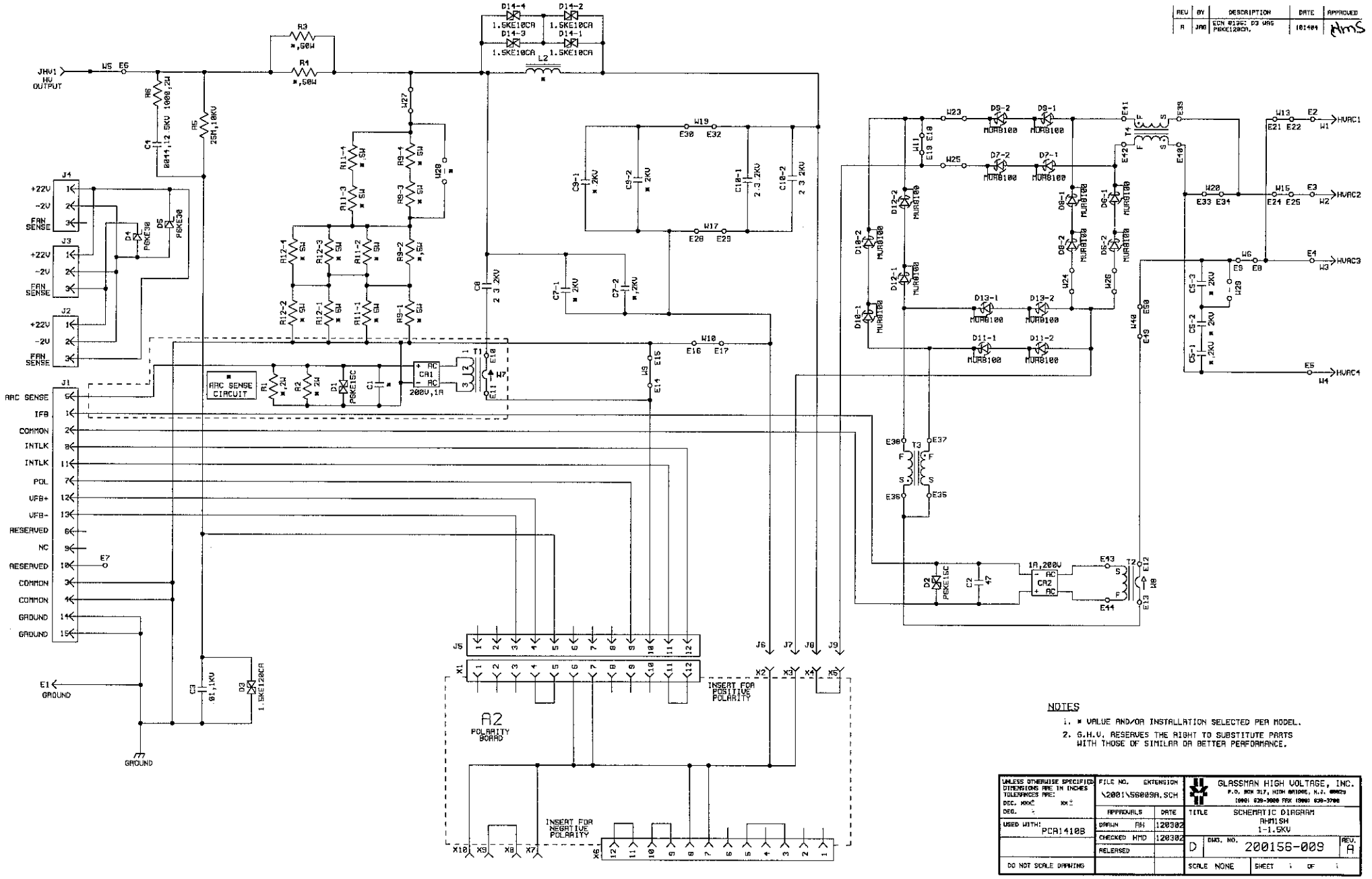


HV ON DS4 RED
HV OFF DS5 GRN
INTLK DS8 YEL
V MODE DS10 GRN
I MODE DS11 YEL
+POL DS6 GRN
-POL DS7 GRN
FAULT DS9 RED
REMOTE V DS2 GRN
REMOTE I DS1 GRN
REMOTE ENABLE DS3 GRN
+15V
R1 1500 1%
R2 1500 1%
R3 1650 1%
R4 1650 1%
R5 1650 1%
R6 1500 1%
R7 1500 1%
R8 1500 1%
R9 1500 1%
R10 1500 1%
R11 1500 1%
COMMON
P/O J1
COMMON 12
COMMON 11
HV ON LED 15
HV OFF LED 14
INTLK LED 2
+10V REF 1
+15V 13
SPARE 9
SPARE 8
E2
E3
C2 4.7 35V
+10VREF
+15V
P/O J3
V MODE LED 15
I MODE LED 12
+POL LED 10
-POL LED 13
FAULT LED 1
LOCAL/REMOTE SWITCHES
S1 V
S2 I
+10VREF
J6
V CONTROL
CW
SL
CCW
J5
I CONTROL
C1 .47
GROUND
COMMON
C11 .47
D7 P6KE15C
LOCAL/REMOTE SWITCH
S3 ENABLE
J2
PROG COM
V PROG
V RMT PROG
I PROG
I RMT PROG
GROUND
GROUND E1
E1
J4
LCL HV OFF SW
LCL HV ON SW
F4
E5
P/O J1
LCL HV ON SW
LCL HV OFF SW
LCL/RMT SW
RMT SW
SPARE
SPARE
E6
E7
R19 **
R12 200
CW
R13 10,1%
R14 20,1%
R15 40.2,1%
R16 78.7,1%
R17 162,1%
R18 17.4,1%
W7 SB-NO
W8 SB-NO
W9 SB-NO
W10 SB-NO
W11 SB-NO
D1 MPTE5
C3 .047
C4 .47
J7
W1 SB-NO
W2 SB-NO
W3 SB-NO
D3
D2
D1
M2 MA METER
+5V
E8
+15V
R20 1000,1%
78L05
U1
C5 .47
C6 .47
J8
R21 200
R22 10.1%
R23 20,1%
R24 40.2,1%
R25 78.7,1%
R26 162,1%
R27 17.4,1%
W16 SB-NO
W15 SB-NO
W14 SB-NO
W13 SB-NO
W12 SB-NO
R28 **
D2 MPTE5
C7 .047
C8 .47
W4 SB-NO
W5 SB-NO
W6 SB-NO
M1 KV METER
E9
COMMON
P/O J3
I METER
V METER
METER COM
COMMON
COMMON
SPARE
SPARE
SPARE
E10
E11
E12

NOTES

1. UNLESS OTHERWISE SPECIFIED:
   A) ALL CAPACITORS ARE IN uF.
2. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
3. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.
4. ** R19 & R28 ARE 15.8K,1% FOR 10V REF MODELS AND 7.87K,1% FOR 5V REF MODELS.

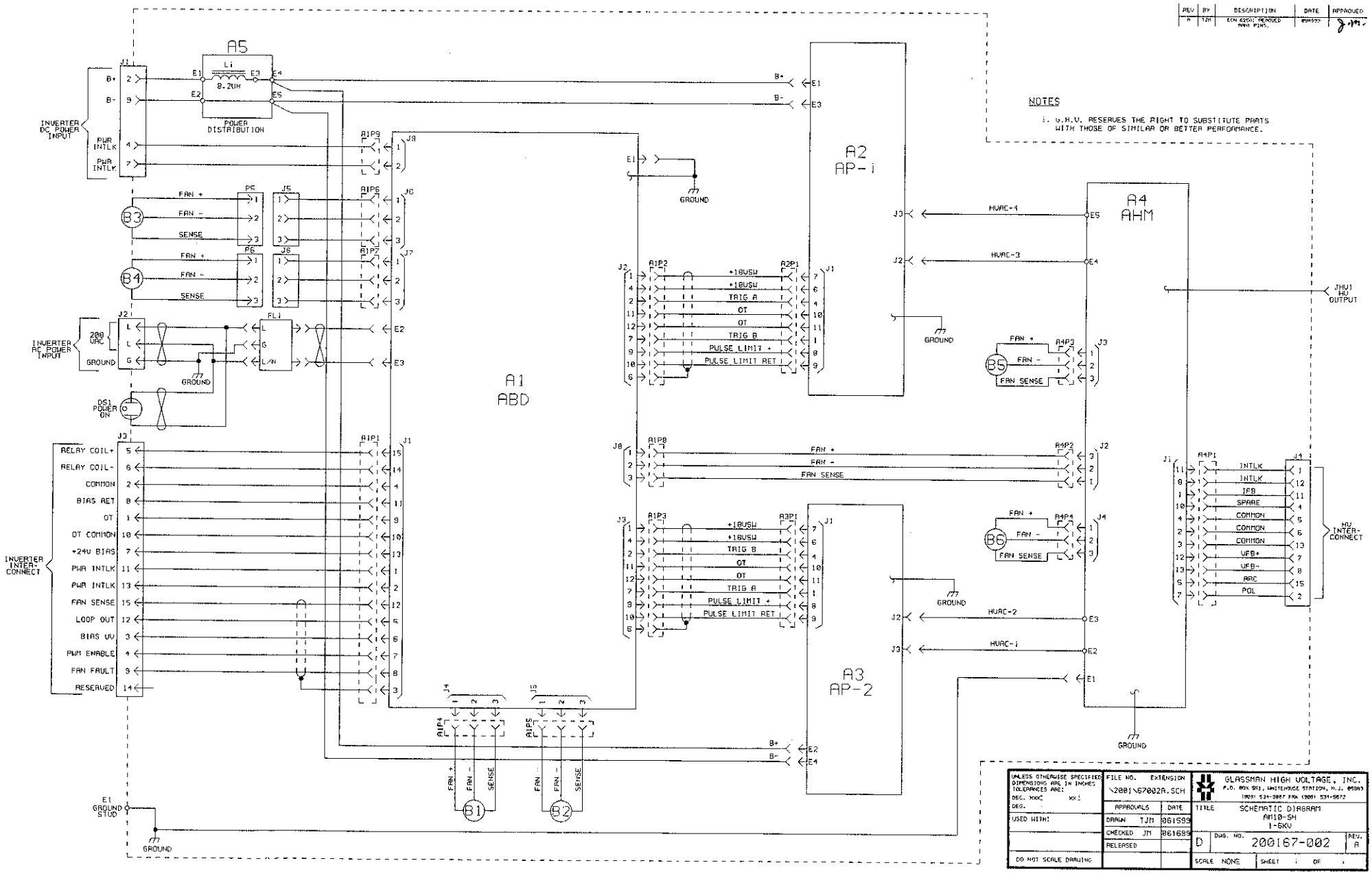
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX XX. DEG.	FILE NO. EXTENSION \200\6200181.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
USED WITH:	APPROVALS / DATE; DRAWN TJN 032299; CHECKED SD 032299; RELEASED	TITLE SCHEMATIC DIAGRAM ADM-5H-01
		D DWG. NO. 200162-001 REV. B-1
DO NOT SCALE DRAWING		SCALE NONE SHEET 1 OF 1



NOTES

1. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
2. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± XX± DEG. ±	FILE NO. EXTENSION \200\S6009A.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700
	APPROVALS DATE	TITLE SCHEMATIC DIAGRAM AM1SH 1-1.5KV
USED WITH: PCA1410B	DRAWN AH 120302	
	CHECKED HMD 120302	D DWG. NO. 200156-009 REV. A
	RELEASED	
DO NOT SCALE DRAWING		SCALE NONE SHEET 1 OF 1



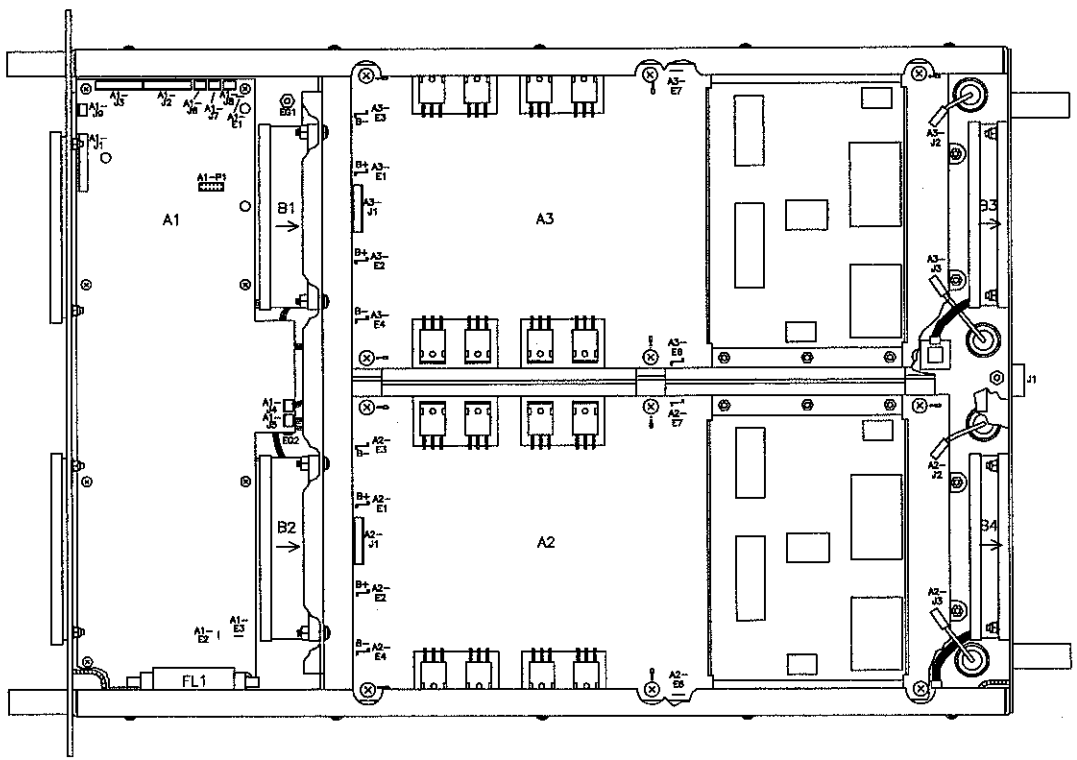
REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 02001 REMOVED PARK PINS.	061599	

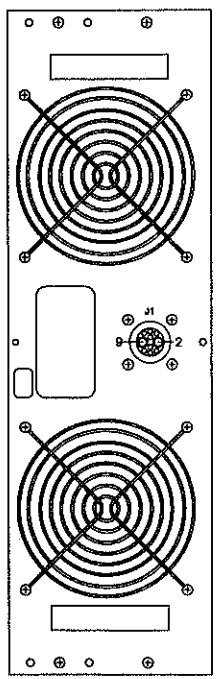
NOTES

1. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEG. XXX± XX± DEG.	FILE NO. EXTENSION \2001\67002A.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-3887 FAX (908) 534-9672
USED WITH:	APPROVALS / DATE	TITLE SCHEMATIC DIAGRAM AM10-5M 1-5KV
	DRAWN TJM 061599	
	CHECKED JM 061699	D DWG. NO. 200167-002 REV. A
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 1

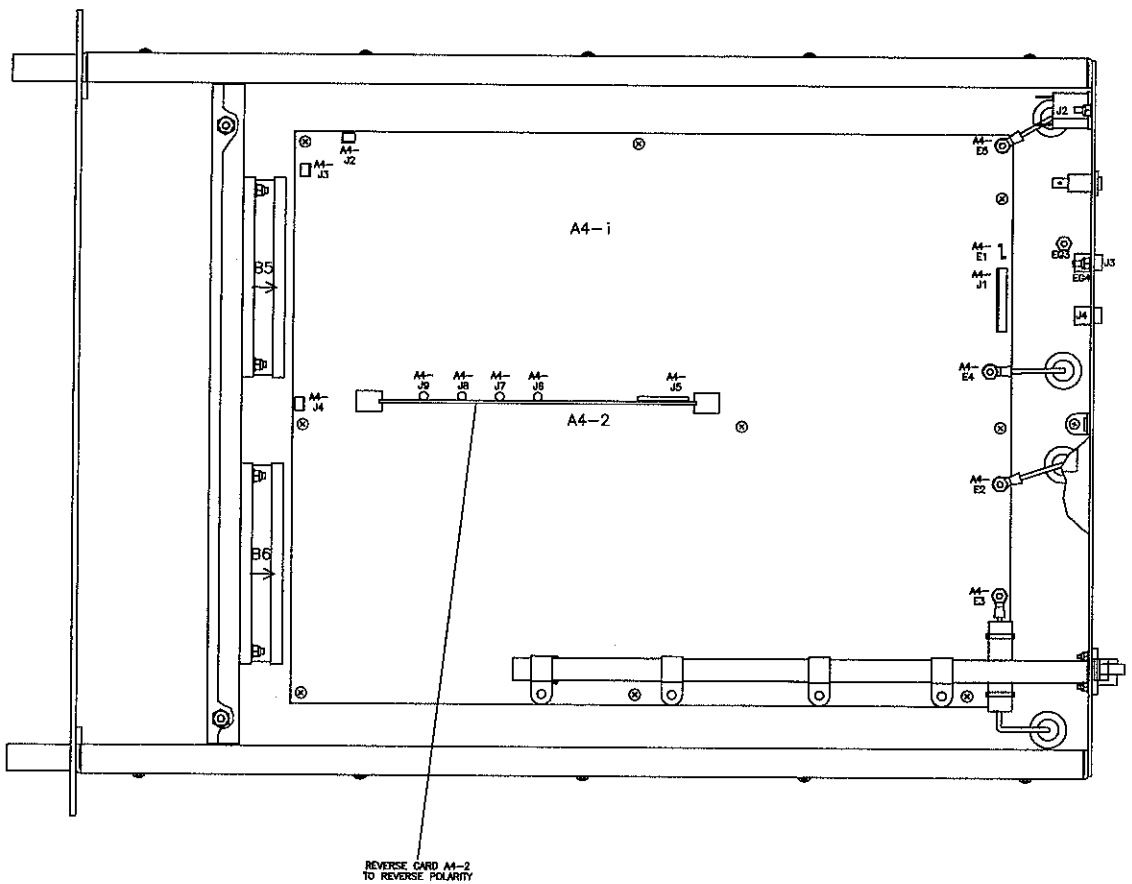
REV	BY	DESCRIPTION	DATE	APPROVED

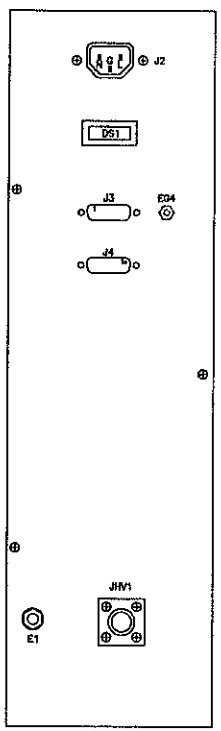




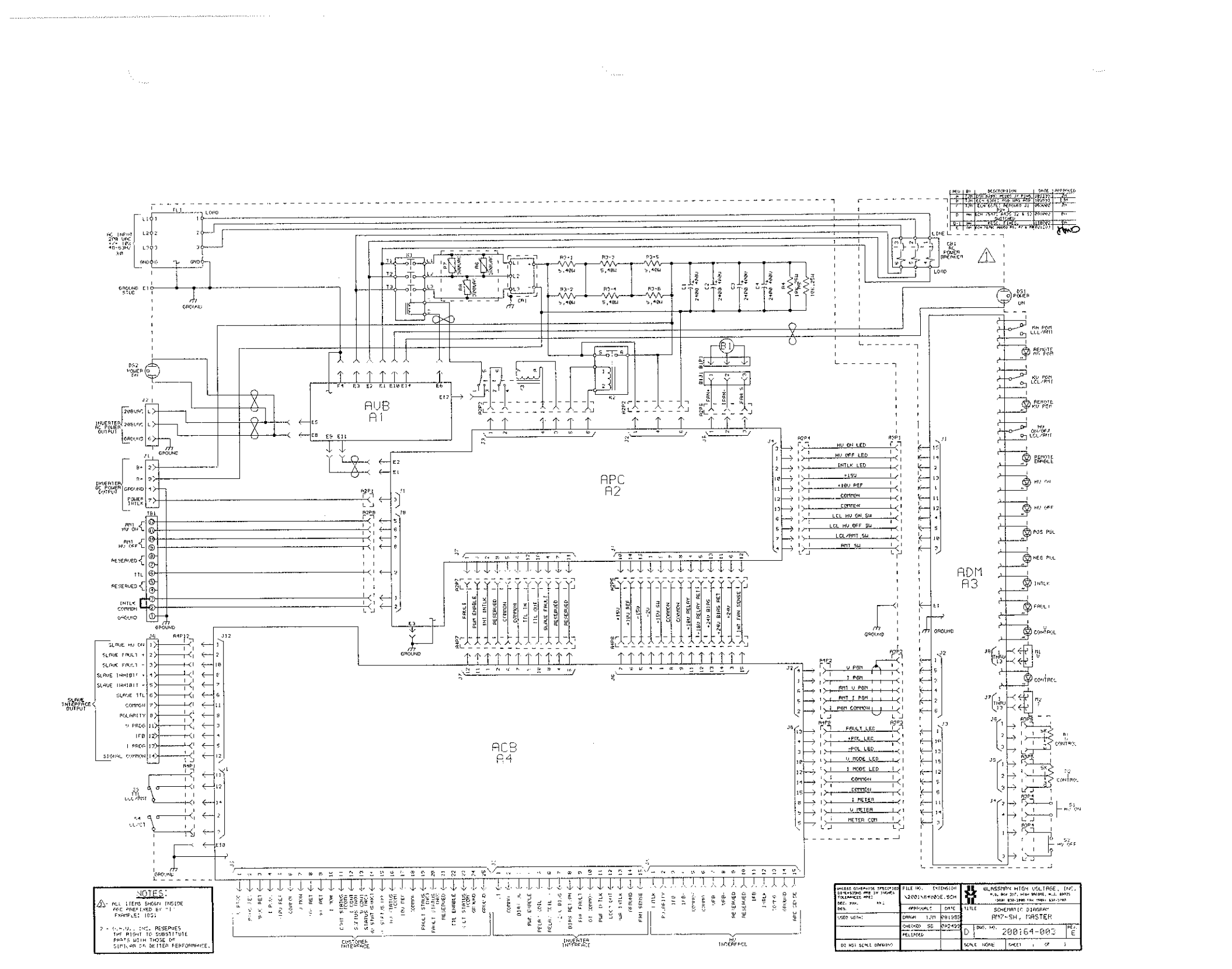
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX± DEG. ±	FILE NO. EXTENSION \2014\03029-.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
	APPROVALS / DATE	TITLE PARTS PLACEMENT TOP AM10-SH, 1-6KV
	DRAWN JAG 100605	
	CHECKED 9/6/05	D DWG.NO. 201403-029 REV. NR
THIRD ANGLE PROJECTION	RELEASED	
DO NOT SCALE DRAWING		SCALE NONE SHEET 1 OF 2

REV	BY	DESCRIPTION	DATE	APPROVED

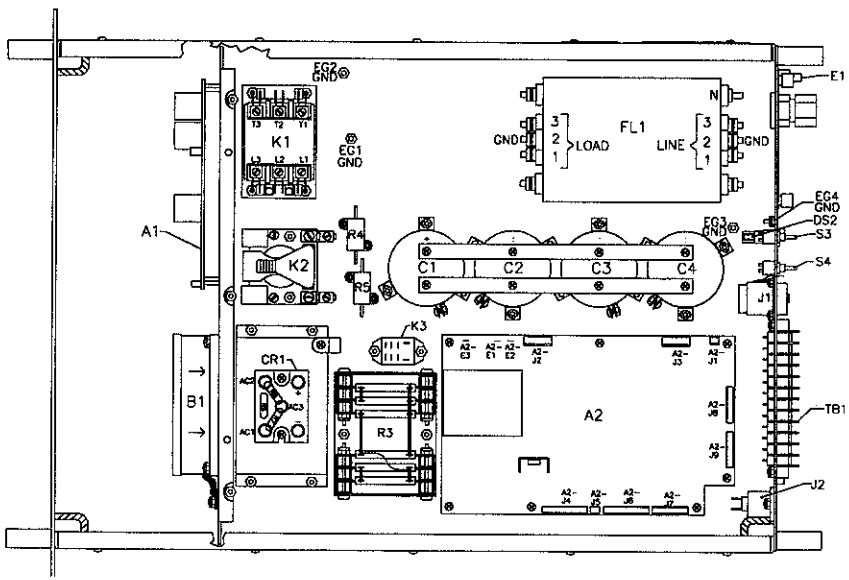


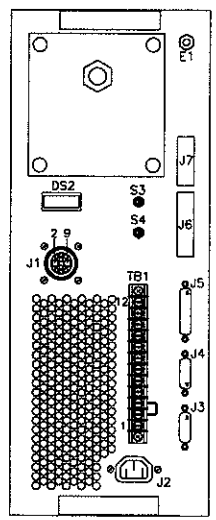


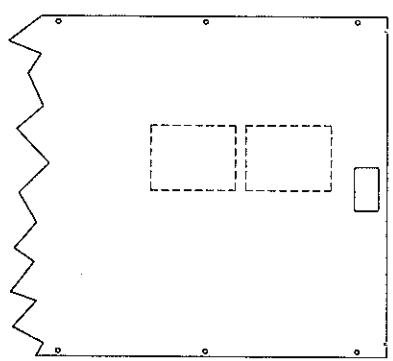
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ± THIRD ANGLE PROJECTION DO NOT SCALE DRAWING	FILE NO. EXTENSION \2014\03029-.DWG APPROVALS DATE DRAWN JAG 100605 CHECKED 10/6/05 RELEASED	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3000 FAX (908) 638-3700 TITLE PARTS PLACEMENT BOTTOM AM10-SH, 1-6KV D DWG.NO. 201403-029 REV. NR SCALE NONE SHEET 2 OF 2


AVB
A1
APC
A2
ADM
A3
ACB
A4
NOTES:
ALL ITEMS SHOWN INSIDE ARE PREFIXED BY "1" EXAMPLE: 1DS1
2. GLASSMAN, INC. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.
GLASSMAN HIGH VOLTAGE, INC.
SCHEMATIC DIAGRAM
AM7-SW, MASTER
200164-003
CUSTOMER INTERFACE
INVERTER INTERFACE
HV INTERFACE

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 8280; TB1-1 TO -2 REMOVED	081199	EJH
B	TJM	ECN 8329; ADDED FL1 DETAIL	101899	JMC
C	TJM	ECN 8768; STRAIN RELIEF	071100	EJH
D	AH	ECN 7878; ADDED R6, R7 AND R8.	021303	HEAD
E	AH	ECN 7932; REMOVED FL1 MOUNTING	010804	



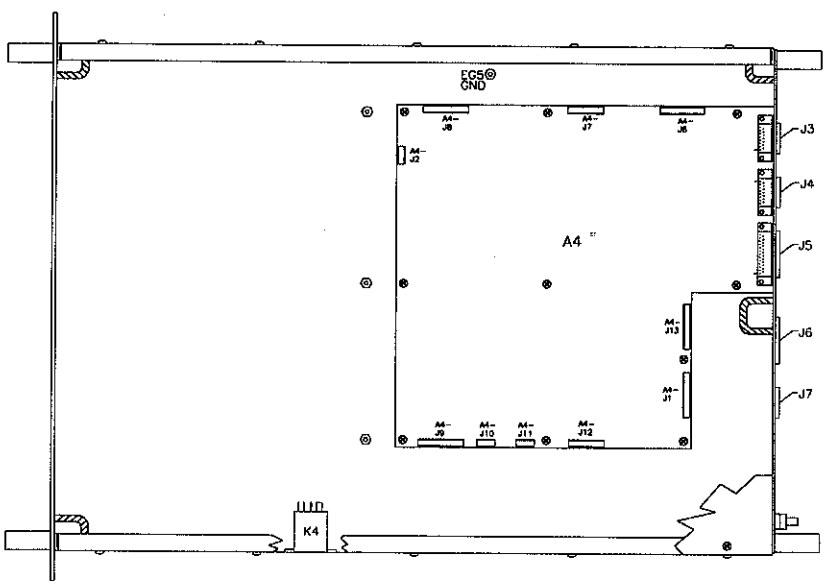


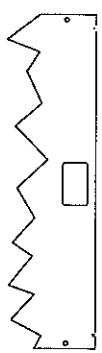


REAR OF
POWER SUPPLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± .005 DEG. ± 1	FILE NO. \2014\00002E.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
THIRD ANGLE PROJECTION	APPROVALS / DRAWN TJM 043099 / CHECKED JMC 052099 / RELEASED	TITLE: PARTS PLACEMENT AM7-SH
DO NOT SCALE DRAWING		D — DWG.NO. 201400-002 — REV. E
		SCALE NONE — SHEET 1 OF 2

REV	BY	DESCRIPTION	DATE	APPROVED

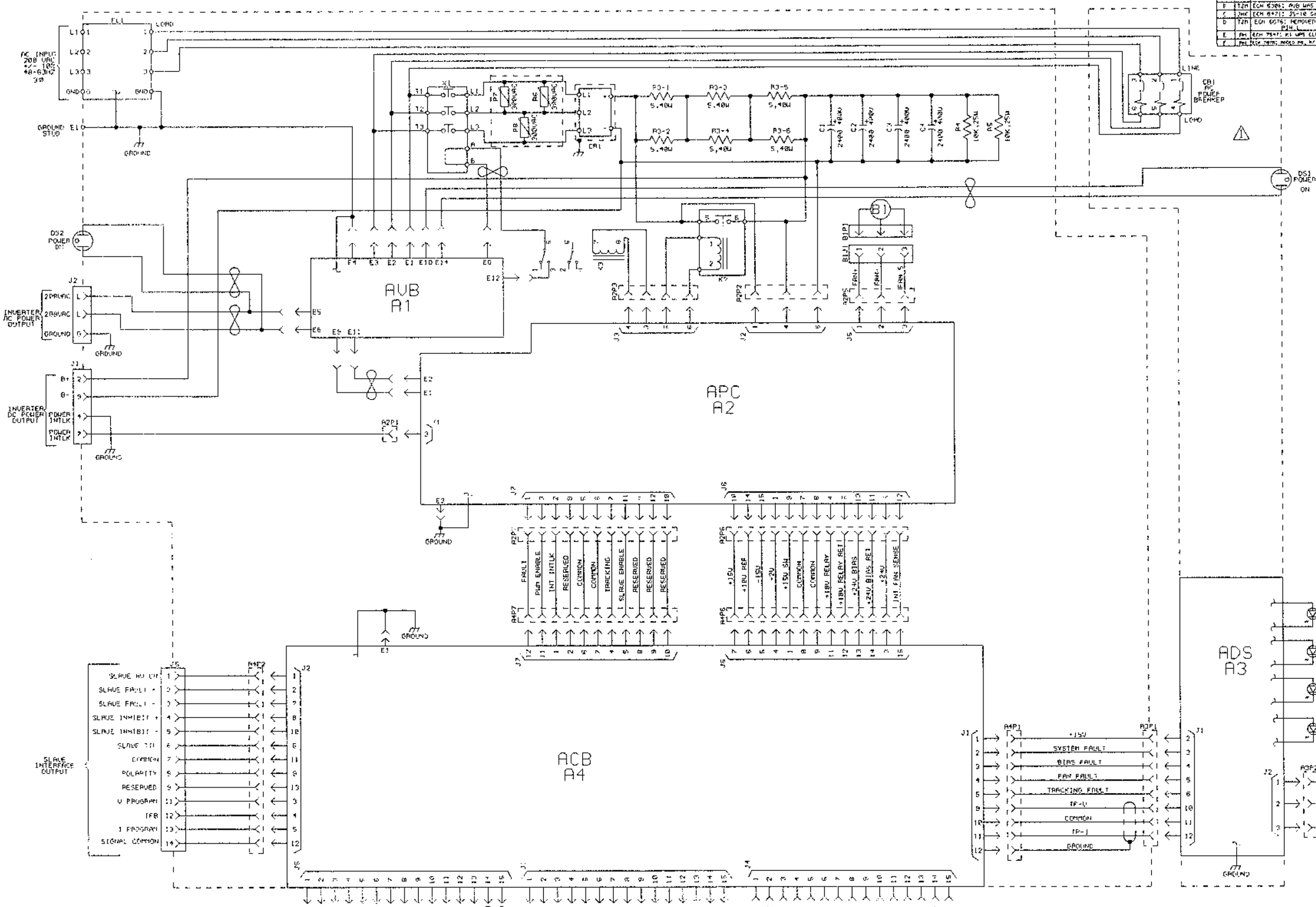




REAR OF
POWER SUPPLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \2014\00002E.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
THIRD ANGLE PROJECTION	APPROVALS / DATE	TITLE: PARTS PLACEMENT AM7-SH
DO NOT SCALE DRAWING	DRAWN TJM 043099	
	CHECKED JMC 052099	D DWG.NO. 201400-002 REV. E
	RELEASED	SCALE NONE SHEET 2 OF 2

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6285: ADDED J7 PINS	101194	JM
B	TJM	ECN 6386: AVB WAS ATR	102895	EJM
C	JWC	ECN 6471: J5-10 SHOWN	021700	JH
D	TJM	ECN 6576: REMOVED J1 PIN	052800	JH
E	AM	ECN 7547: K1 WAS CLOSED	091102	BG
F	AM	ECN 7878: MOVED P9, R7 & P8	021203	



AC INPUT 208 VAC +/- 10% 48-63HZ 3Ø
FL1
LINE
LOAD
GROUND STUD
GROUND
CB1 AC POWER BREAKER
DS1 POWER ON
DS2 POWER ON
INVERTER AC POWER OUTPUT
2DRVAC
2RVAC
INVERTER DC POWER OUTPUT
POWER INTLK
AVB A1
APC A2
ACB A4
ADS A3
R3-1 5,40W
R3-2 5,40W
R3-3 5,40W
R3-4 5,40W
R3-5 5,40W
R3-6 5,40W
C1 2400 400V
C2 2400 400V
C3 2400 400V
C4 2400 400V
R4 10K,25W
R5 10K,25W
R6 300VAC
R7 300VAC
R8 300VAC
EA1
K1
K2
K3
B1
FAN+
FAN-
FAN S
FAULT
PWM ENABLE
INT INTLK
RESERVED
COMMON
TRACKING
SLAVE ENABLE
+15V
+18V REF
-15V
+2V
+15V SH
+18V RELAY
+18V RELAY RET
+24V BIAS
+24V BIAS RET
+24V
INT FAN SENSE
SYSTEM FAULT
BIAS FAULT
FAN FAULT
TRACKING FAULT
TP-V
TP-I
TP-COM
TRACKING
FAN
BIAS
SYSTEM
SLAVE HV ON
SLAVE FAULT +
SLAVE FAULT -
SLAVE INHIBIT +
SLAVE INHIBIT -
SLAVE TTL
POLARITY
V PROGRAM
IFB
I PROGRAM
SIGNAL COMMON
SLAVE INTERFACE OUTPUT
SLAVE INTERFACE INPUT
INVERTER INTERFACE
HV INTERFACE
BIAS RETURN
RELAY COIL
PWM ENABLE
FAN FAULT
LOOP OUT
PLS INTLK
ARC SENSE
INTLK
VFB

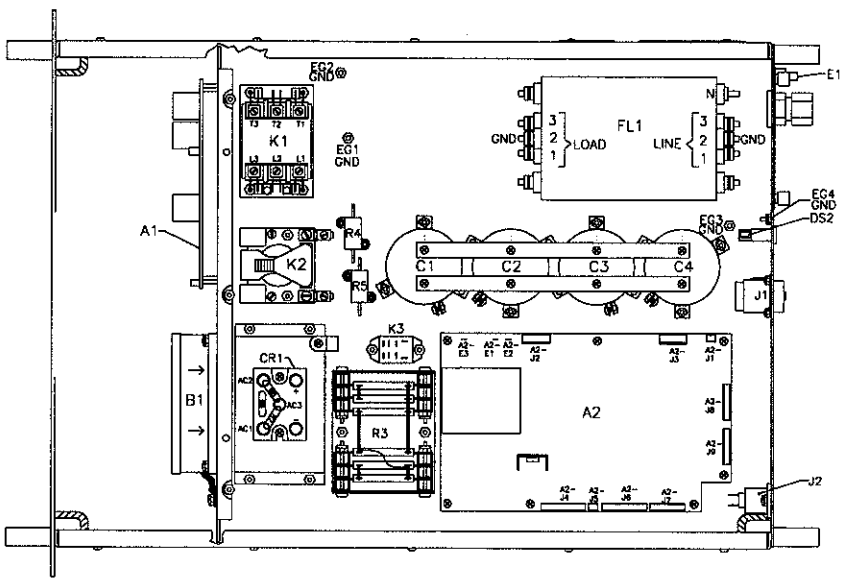
NOTES:

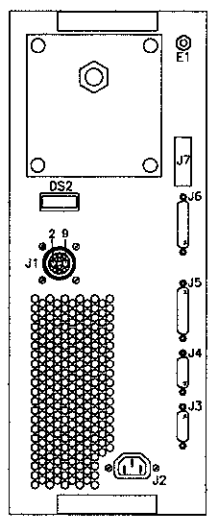
1. ALL ITEMS SHOWN INSIDE ARE PREFIXED BY "1". EXAMPLE: 1DS1

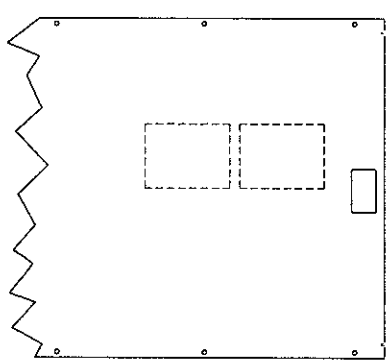
2. G.H.V., INC. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XX: ±; XX: ±; DEG. ±	FILE NO. EXTENSION \200\164004F.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829	
USED WITH:	APPROVALS / DATE; DRAWN TJM 062196; CHECKED SJ 082496; RELEASED	TITLE SCHEMATIC DIAGRAM AM7-SH, SLAVE	
DO NOT SCALE DRAWING		D DWG. NO. 200164-004	REV. F
		SCALE NONE SHEET	

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6329: ADDED FL1 DETAIL	101899	JMC
B	TJM	ECN 6786: STRAIN RELIEF RELOCATED	071100	EJM
C	AH	ECN 7678: ADDED R6, R7 AND R8.	021203	HMC
D	AH	ECN 7932: REMOVED FL1 MOUNTING	010904	



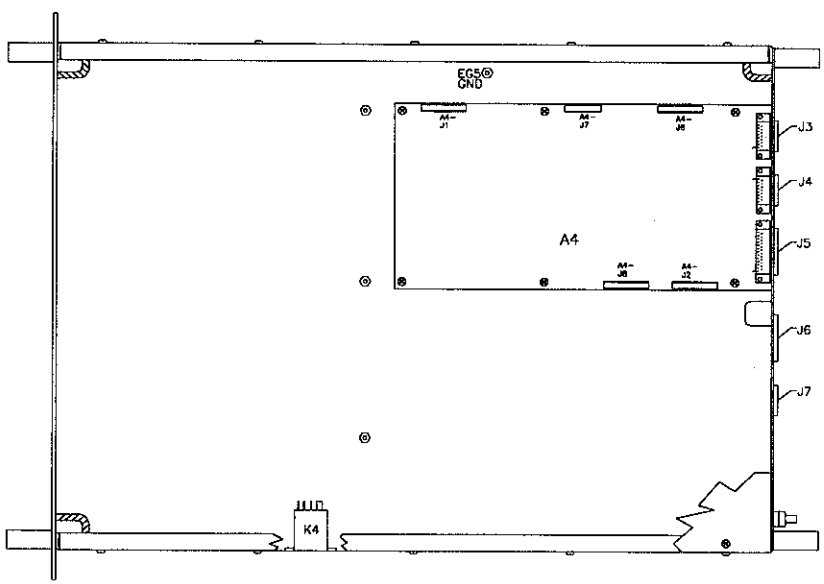


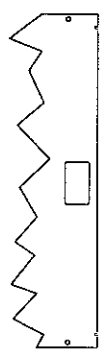


REAR OF
POWER SUPPLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± 10' ± DEC. X ±	FILE NO. EXTENSION \2014\00004D.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
THIRD ANGLE PROJECTION	APPROVALS / DRAWN TA 092999 / CHECKED JMC 092999 / RELEASED	TITLE: PARTS PLACEMENT AM7-SH, SLAVE
DO NOT SCALE DRAWING		D — DWG.NO. 201400-004 — REV. D
		SCALE NONE — SHEET 1 OF 2

REV	BY	DESCRIPTION	DATE	APPROVED

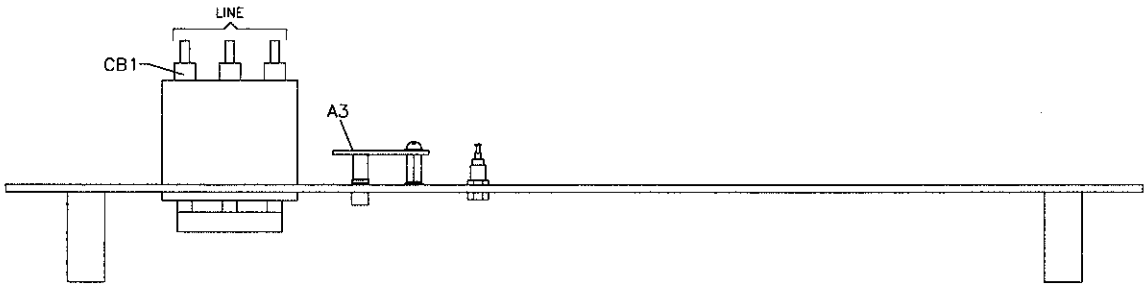


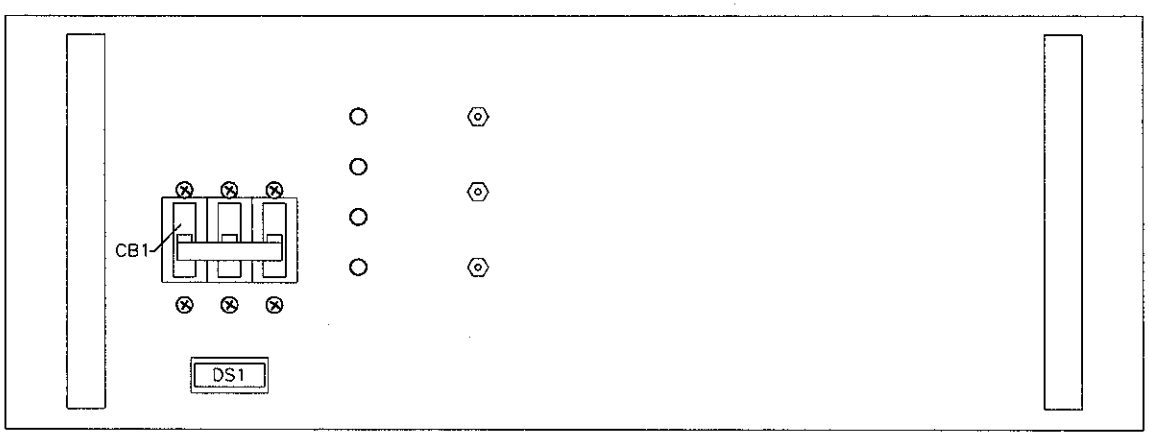


REAR OF
POWER SUPPLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \2014\00004D.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
THIRD ANGLE PROJECTION	APPROVALS / DATE DRAWN TA 092999 CHECKED JMC 092999 RELEASED	TITLE: PARTS PLACEMENT AM7-SH, SLAVE
DO NOT SCALE DRAWING		D DWG.NO. 201400-004 REV. D
		SCALE NONE SHEET 2 OF 2

REV	BY	DESCRIPTION	DATE	APPROVED
NR-1	AH	UPDATED ADDRESS	081903	



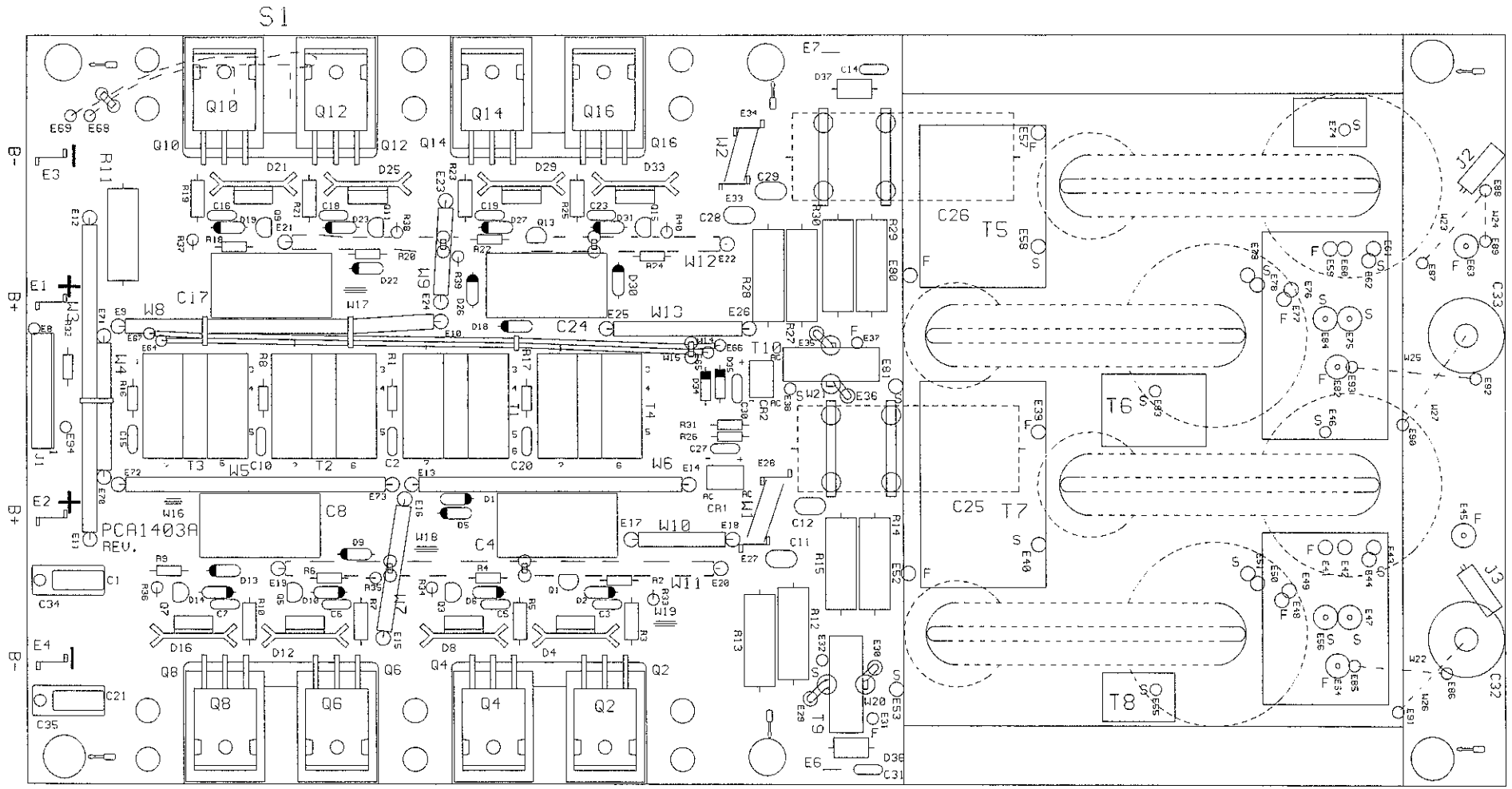


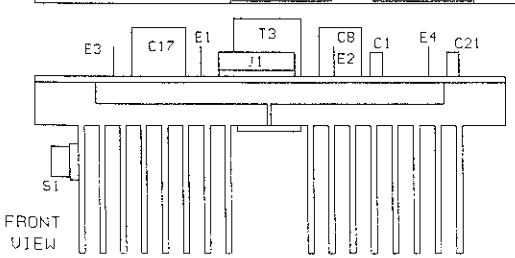
NOTES:

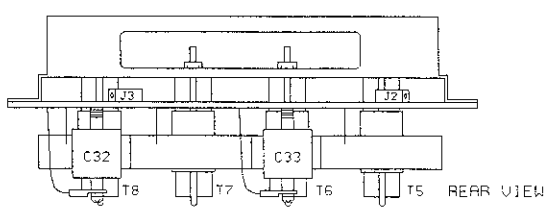
1 – ALL ITEMS SHOWN ARE PREFIXED BY "1"
EXAMPLE: 1CB1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DGL ±	FILE NO. EXTENSION \2014\08005-1.DWG	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
	APPROVALS / DATE	TITLE PARTS PLACEMENT AFP-SH, SLAVE/BLANK
THIRD ANGLE PROJECTION	DRAWN TA 081999	
	CHECKED JMC 081999	D DWG.NO. 201408-005 REV. NR-1
DO NOT SCALE DRAWING	RELEASED	SCALE NONE SHEET 1 OF 1

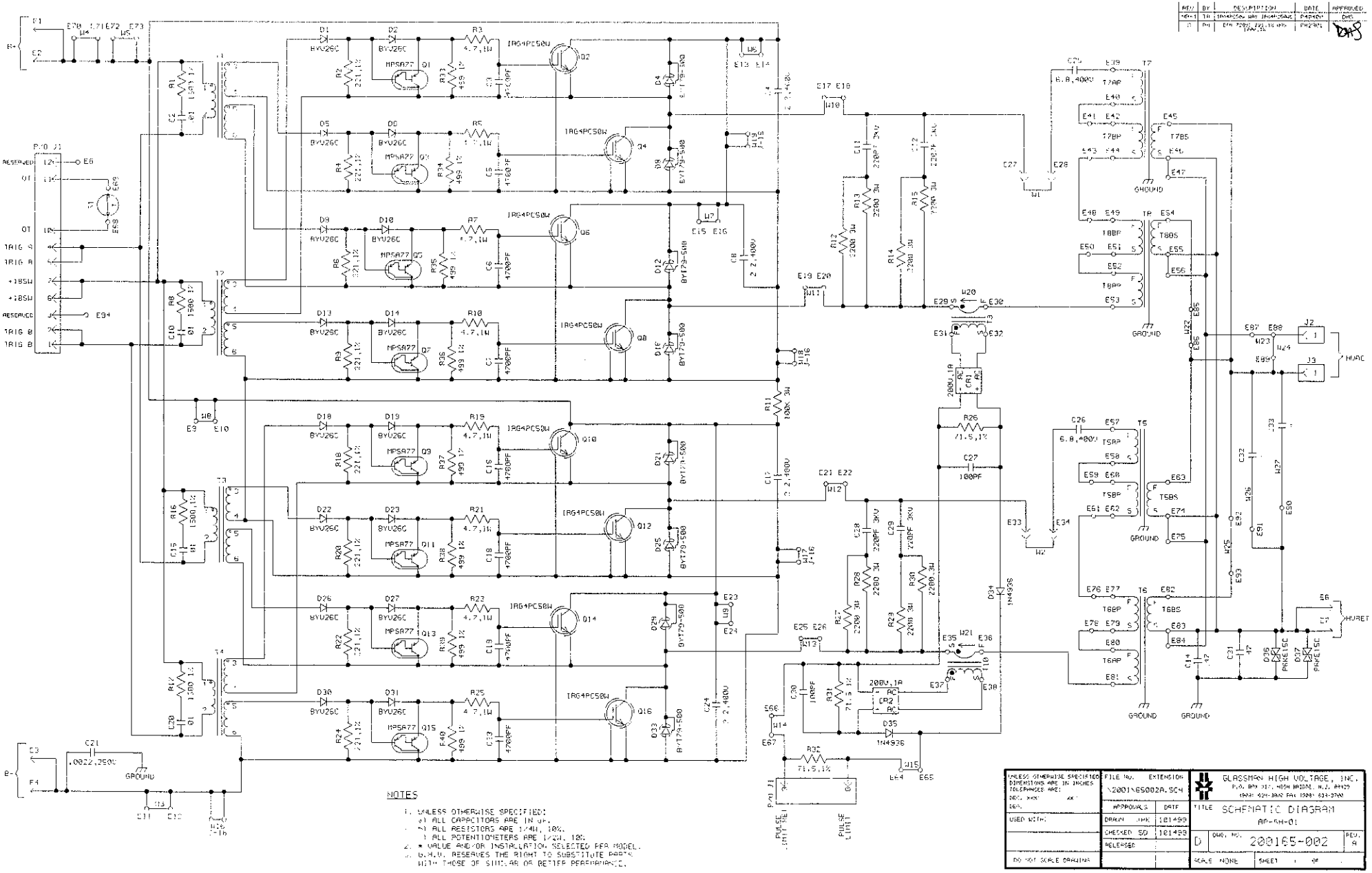
REV	BY	DESCRIPTION	DATE	APPROVED







UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ± THIRD ANGLE PROJECTION DO NOT SCALE DRAWING	FILE NO. EXTENSION \PCA1\403004#.PCB APPROVALS DATE DRAWN JHK 101499 CHECKED JME 102299 RELEASED SSF	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672 TITLE PARTS PLACEMENT AP-SH-01 B DWG.NO. PCA1403-004 REV. NR SCALE NONE SHEET 1 OF 1

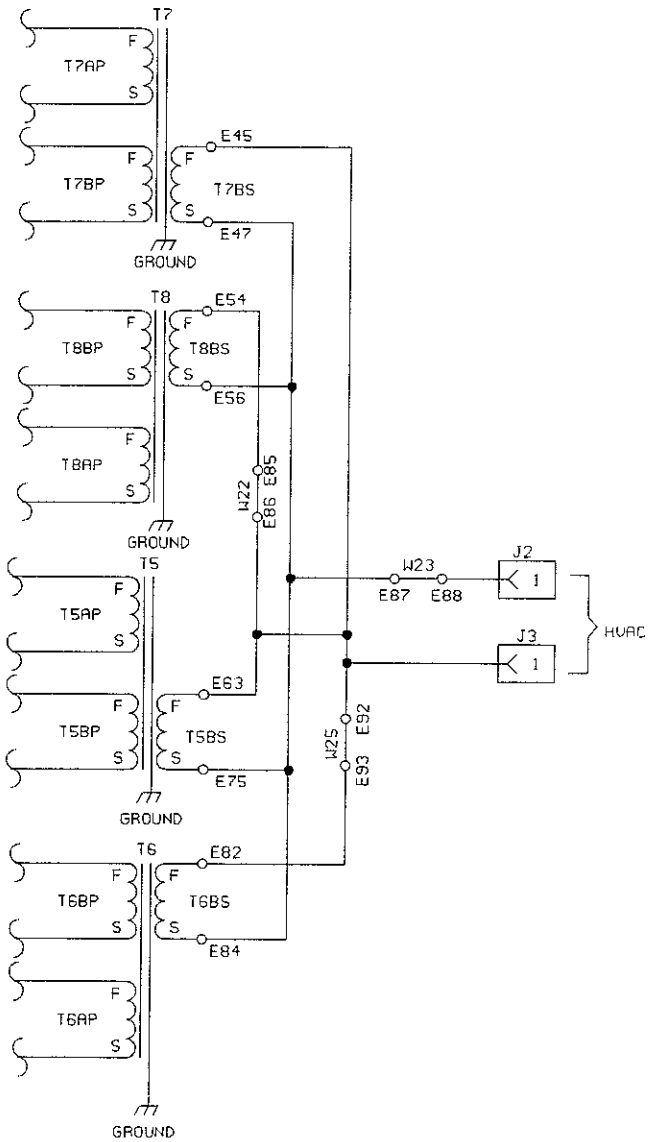

REV | BY | DESCRIPTION | DATE | APPROVED
NOTES
1. UNLESS OTHERWISE SPECIFIED:
a) ALL CAPACITORS ARE IN uF.
b) ALL RESISTORS ARE 1/4W, 10%.
c) ALL POTENTIOMETERS ARE 1/2W, 10%.
2. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
3. G.M.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
DO NOT SCALE DRAWING
FILE NO. EXTENSION
\2001\65002A.SCH
APPROVALS DATE
DRAWN JMK 101499
CHECKED SD 101499
RELEASED
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, N.J. 08829
(908) 638-3900 FAX (908) 638-2700
TITLE SCHEMATIC DIAGRAM
AP-5H-01
D DWG. NO. 200165-002 REV. A
SCALE NONE SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED

AP-SH-1, </=6KV

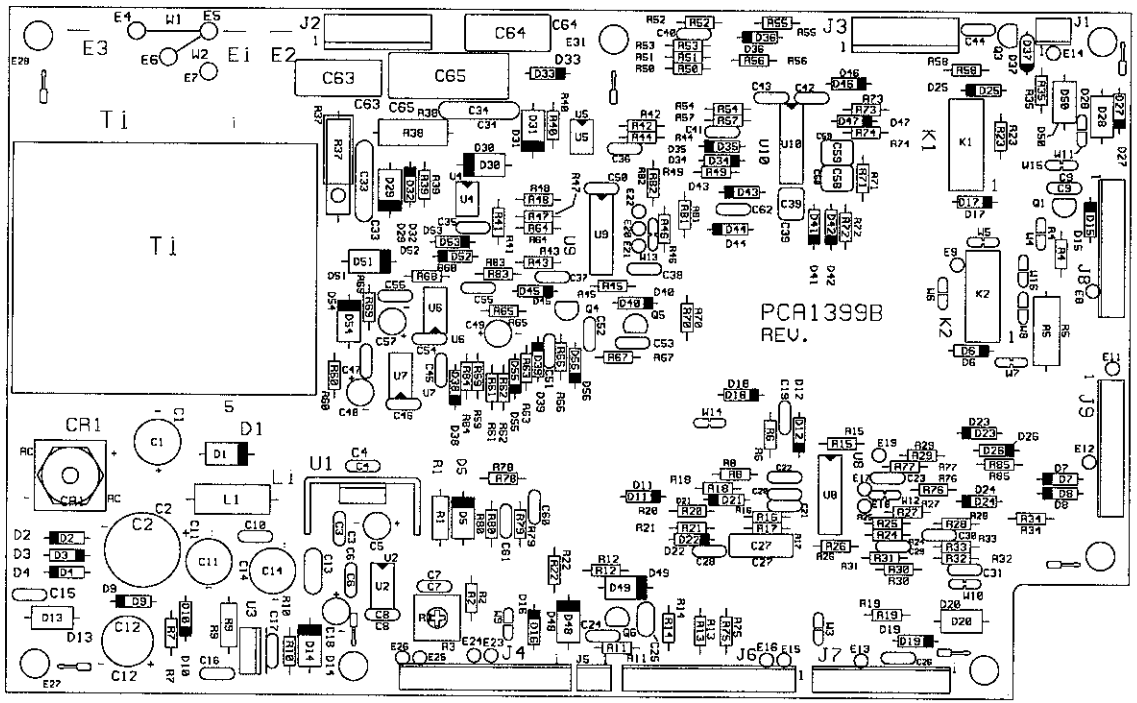
This assembly is the same as AP-SH-1 (schematic # 200165-002), with the following schematic modifications:

1. C14, C31, D36, D37, E6 & E7 are removed.
2. HV secondaries T5BS, T6BS, T7BS & T8BS, along with their associated components, are rewired as shown below.

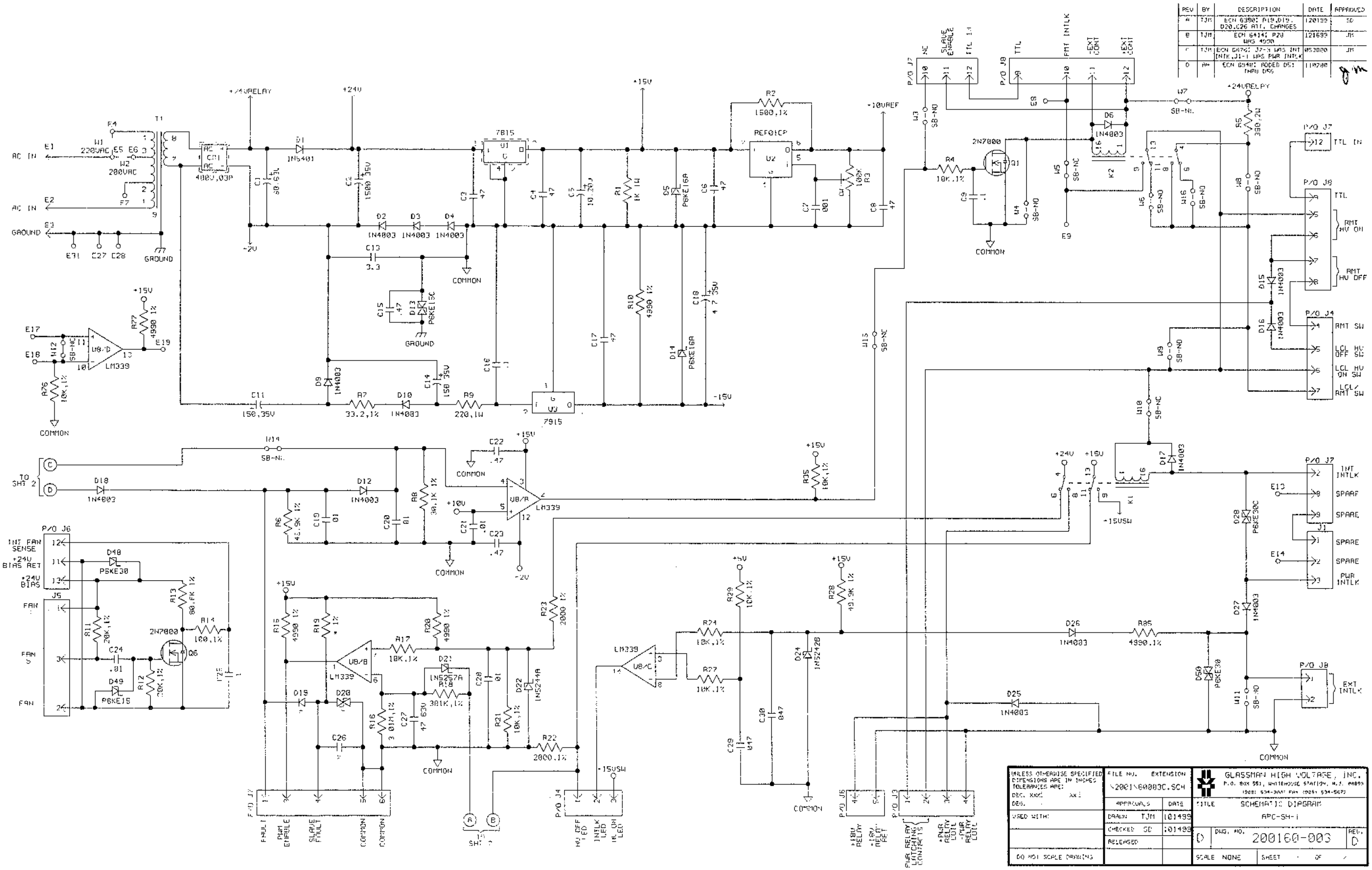


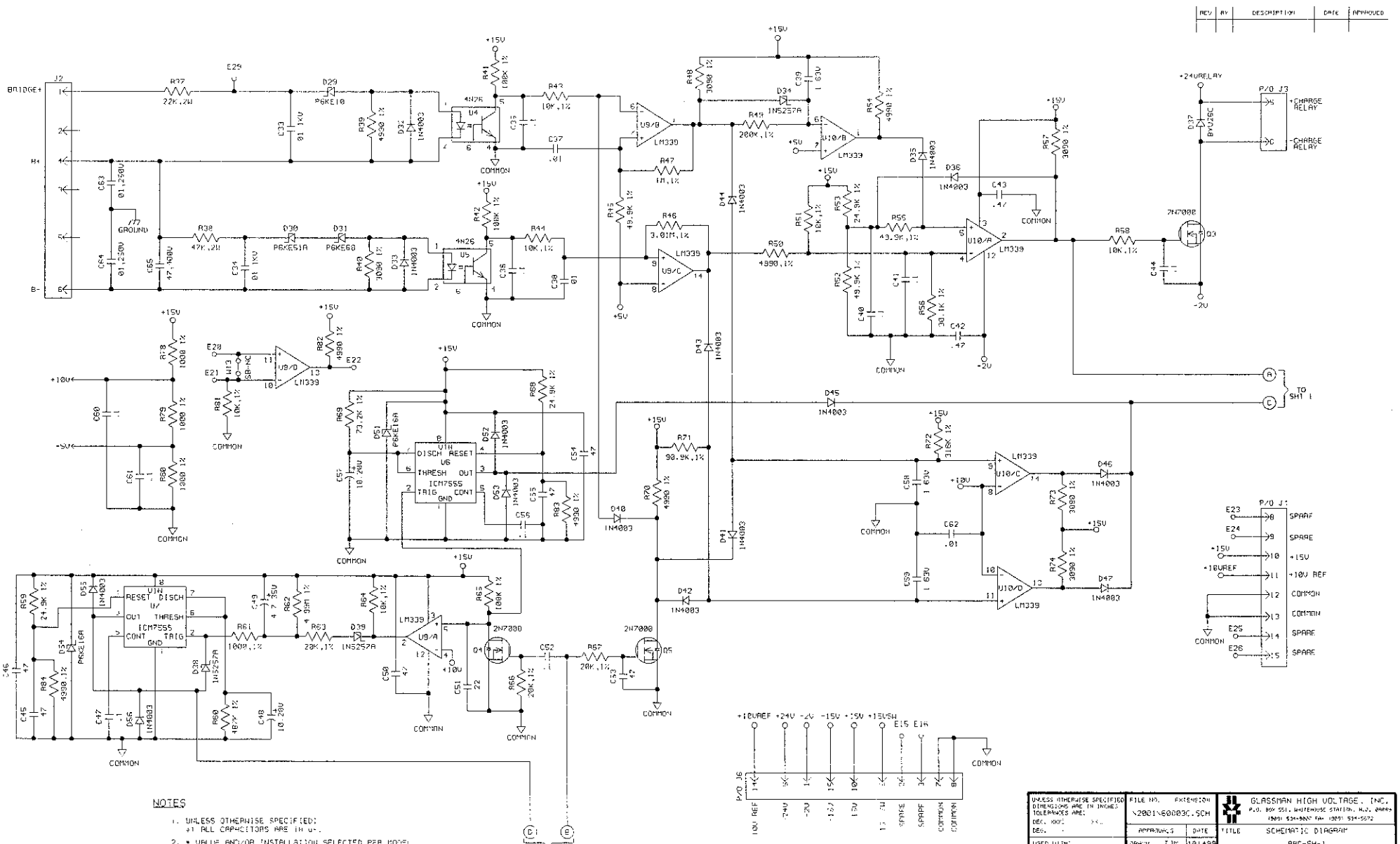
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC XXX± XX± DEG. ±	FILE NO. EXTENSION \2001\65002\101# SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551 WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672	
USED WITH:	APPROVALS / DRAWN TJM / DATE 112100	TITLE SCHEMATIC DIAGRAM AP-SH-1 </=6KV	
	CHECKED DS 11/21/00	A	DWG. NO. 200165-002-101 REV. NR
DO NOT SCALE DRAWING	RELEASED	SCALE NONE	SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \PCA1\399007#.PCB	GLASSMAN HIGH VOLTAGE, INC P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
	APPROVALS / DATE DRAWN TJM 071103 CHECKED Tjm 071603 RELEASED	TITLE PARTS PLACEMENT APC-SH-01 (PCA1399B)
THIRD ANGLE PROJECTION		B DWG.NO. PCA1399-007 REV. NR
DO NOT SCALE DRAWING	SSF	SCALE NONE SHEET 1 OF 1


GLASSMAN HIGH VOLTAGE, INC.
SCHEMATIC DIAGRAM
APC-SH-1
DWG. NO. 200160-003
REV. D
SCALE NONE
FILE NO. \2001\60003C.SCH
DRAWN TJM 101499
CHECKED SD 101499
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DO NOT SCALE DRAWING
REV | BY | DESCRIPTION | DATE | APPROVED
A | TJM | ECN 6390: R19,D19, D20,C26 ATT. CHANGES | 120199 | SD
B | TJM | ECN 6414: R20 WAS 4990 | 121699 | JM
C | TJM | ECN 6475: J7-3 WAS INT INTLK,J1-1 WAS PWR INTLK | 052000 | JM
D | AH | ECN 6948: ADDED D51 THRU D56 | 110700 |
AC IN
GROUND
TO SHT 2
COMMON

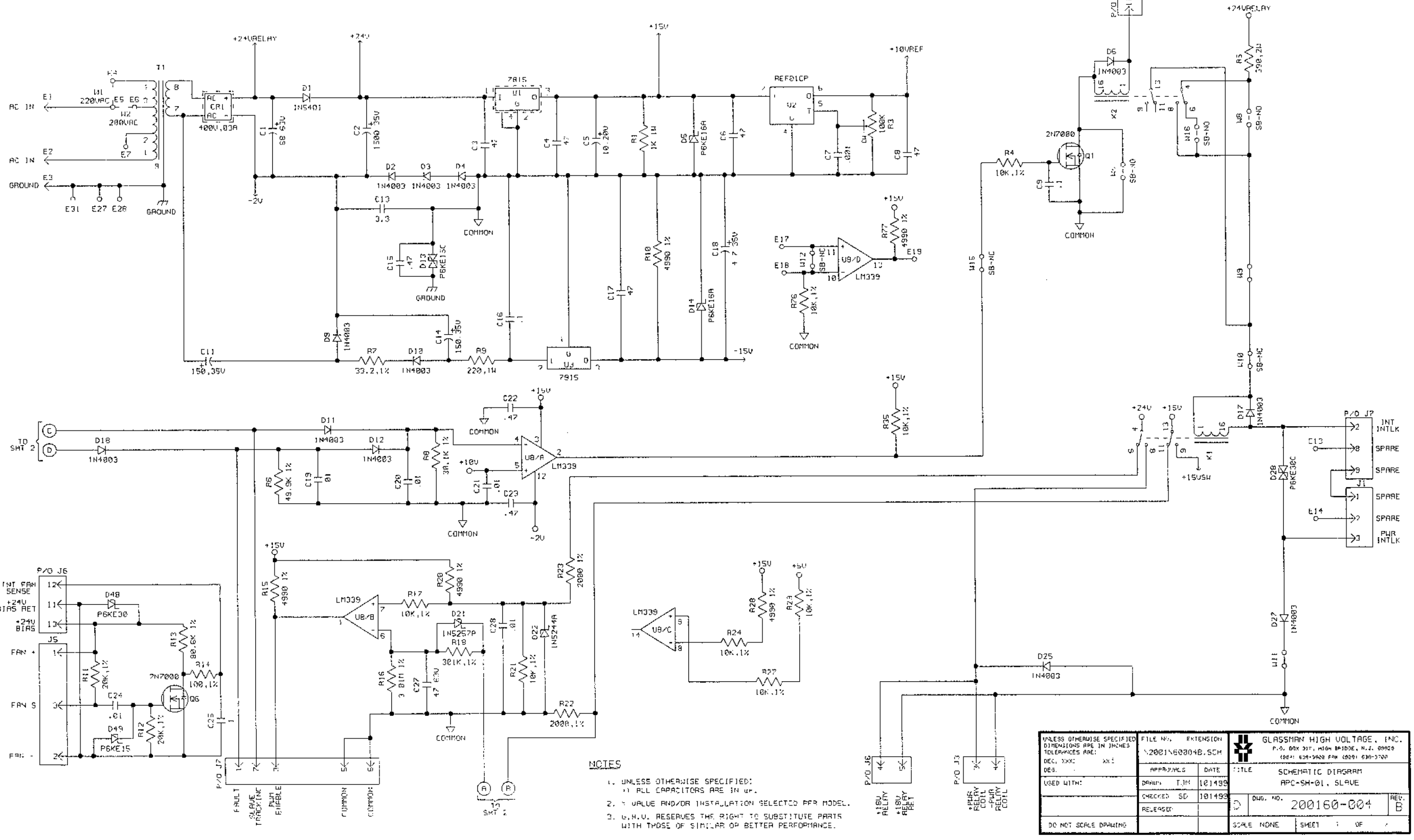


NOTES

1. UNLESS OTHERWISE SPECIFIED:
   a) ALL CAPACITORS ARE IN uF.
2. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
3. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX± .XX± DEG. ±	FILE NO. EXTENSION \2001\60003C.SCH	GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9651 FAX (908) 534-5672	
USED WITH:	APPROVALS DATE	TITLE SCHEMATIC DIAGRAM	
	DRAWN TJM 10/1/99	RPC-SH-1	
	CHECKED SD 10/1/99	D DWG. NO. 200160-003	REV. D
	RELEASED	SCALE NONE	SHEET / OF /
DO NOT SCALE DRAWING			

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6876: J7-9 WAS INT INTLK,J1-3 WAS PWR INTLK	053000	JM
B	AH	ECN 6945: ADDED D51 THRU D56.	110200	J.M.



NOTES

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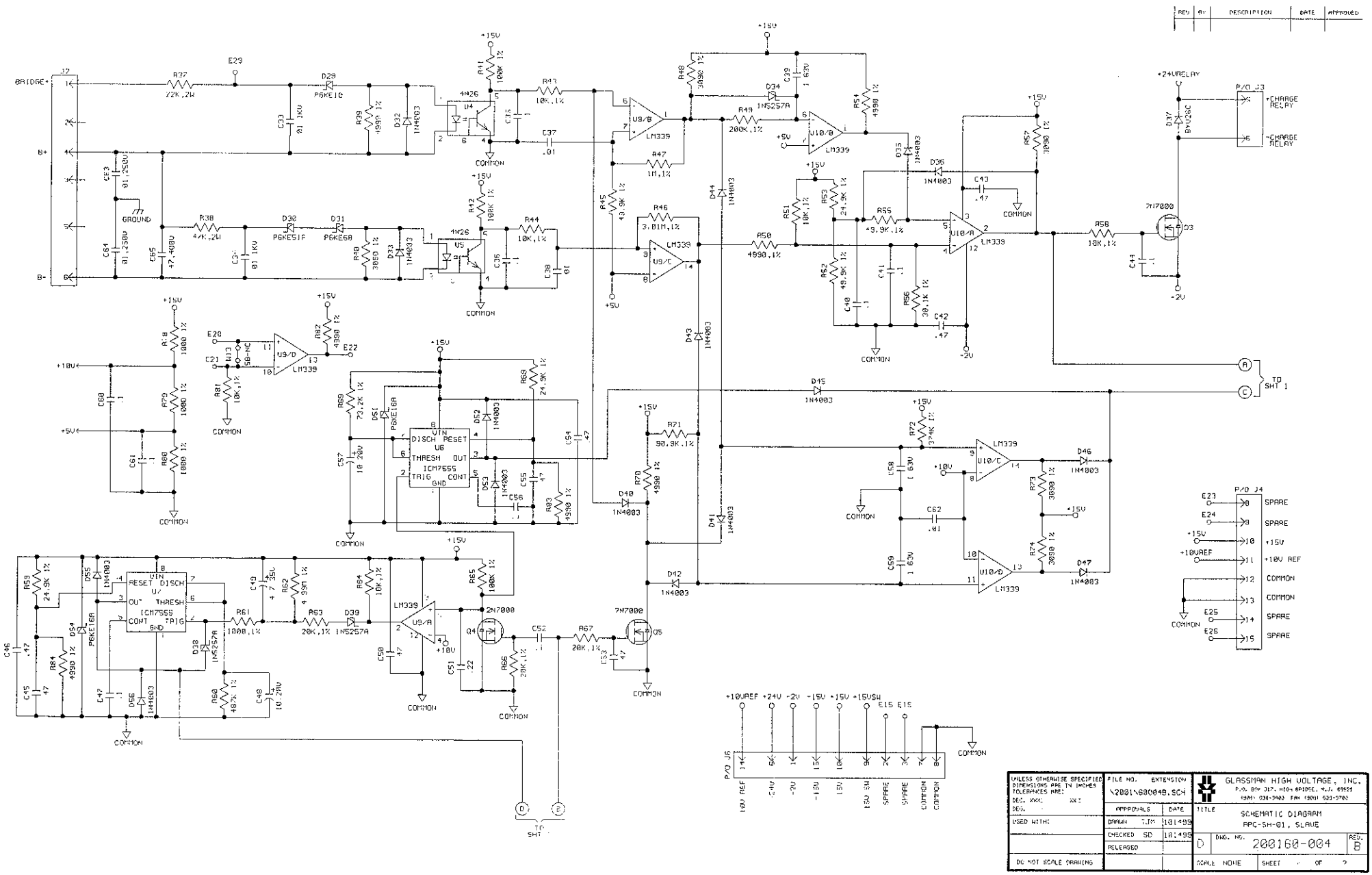
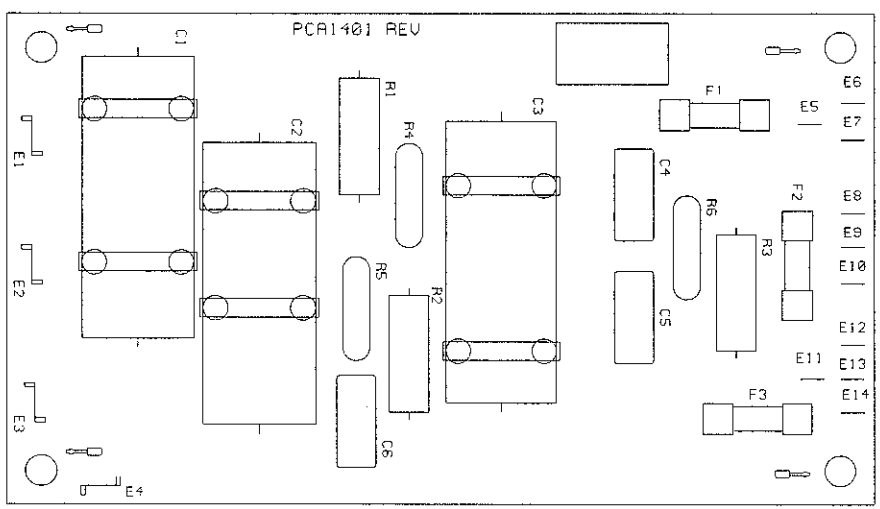
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. XXX: DEG.	FILE NO. EXTENSION \2001\600048.SCH		GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3700
USED WITH:	APPROVALS	DATE	TITLE SCHEMATIC DIAGRAM APC-SH-01, SLAVE
	DRAWN TJM	101499	D DWG. NO. 200160-004 REV. B
	CHECKED SD	101499	
	RELEASED		
DO NOT SCALE DRAWING			SCALE NONE SHEET 1 OF



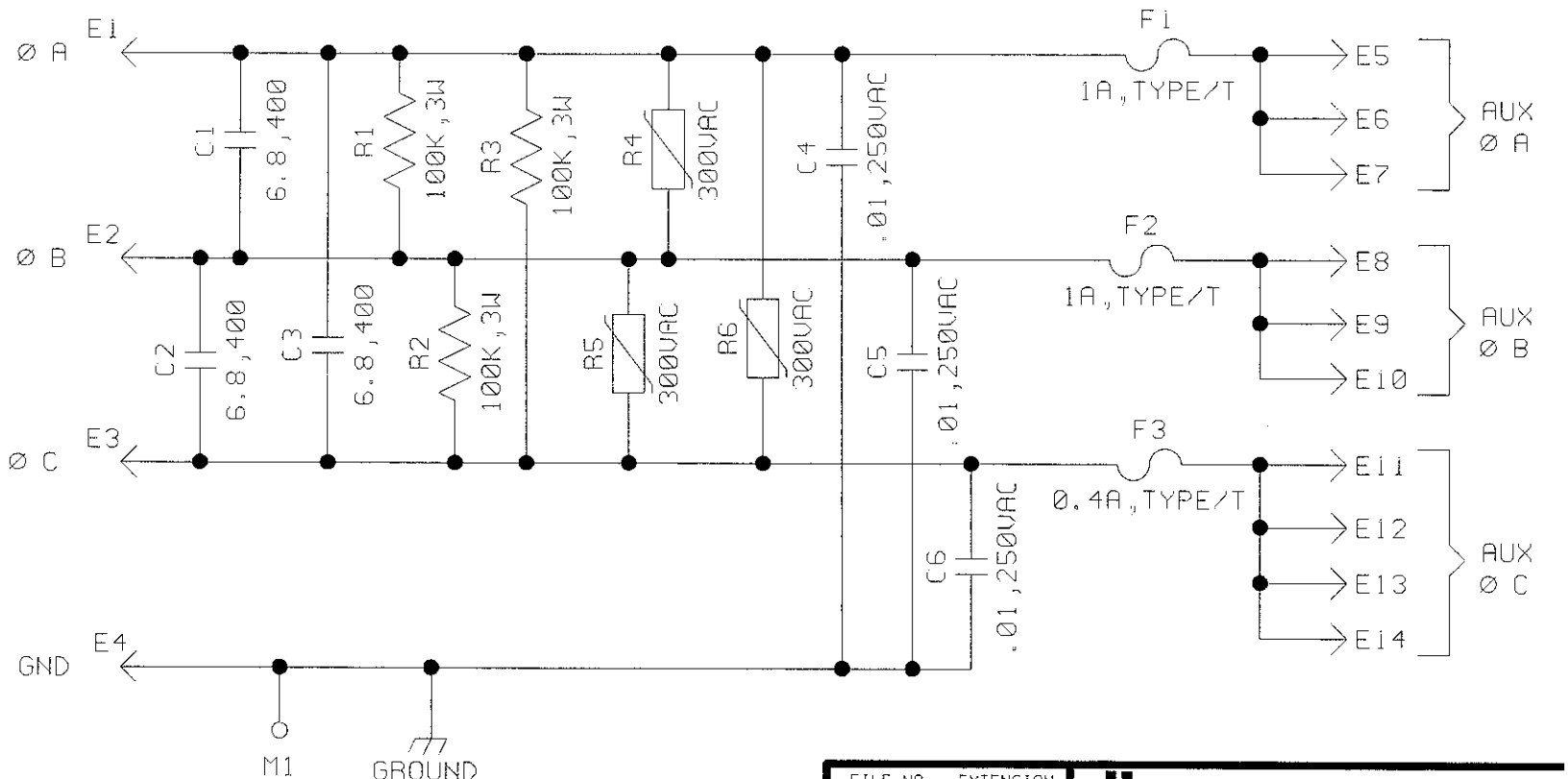
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:	FILE NO. EXTENSION	GLASSMAN HIGH VOLTAGE, INC.
DEC. XXX ± XXX	\2001\600048.SCH	P.O. BOX 317, HIGH BRIDGE, N.J. 08829
DEG. ±	APPROVALS DATE	TITLE SCHEMATIC DIAGRAM RPC-5H-01, SLAVE
USED WITH:	DRAWN TJM 101499	
	CHECKED SD 101499	
	RELEASED	D DWG. NO. 200160-004 REV. B
DO NOT SCALE DRAWING		SCALE NONE SHEET OF

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6151; REMOVED ITEM 2.	061499	JMC
B	TJM	ECN 6306; AVB WAS ATB	102899	CM



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± XX ± DEG. ±	FILE NO. EXTENSION \PCA1\401002B.PCB	GLASSMAN HIGH VOLTAGE, INC P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9007 FAX (908) 534-5672
THIRD ANGLE PROJECTION	APPROVALS / DATE DRAWN TJM 031999 CHECKED JMC 032399 RELEASED	TITLE: PARTS PLACEMENT AVB-SH-01
DO NOT SCALE DRAWING	SSF	B · DWG.NO. PCA1401-002 · REV. B SCALE 1 TO 1 · SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6256: F3 WAS 1A.	080999	JM
B	TJM	ECN 6306: AVB WAS ATB	102899	C/M



NOTES

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FILE NO. EXTENSION	
\2001\63001B.SCH	
APPROVAL	DATE
DRAWN TJM	042699
CHECKED SD	042699
RELEASED	

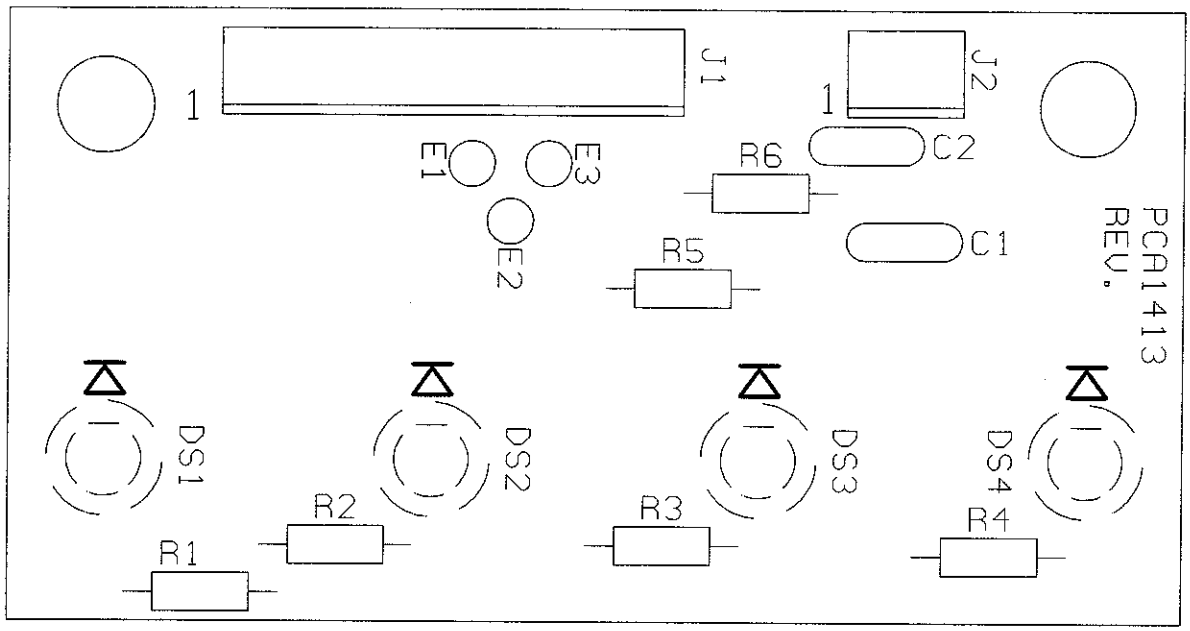
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889
(908) 534-9007 FAX (908) 534-5672

TITLE: SCHEMATIC DIAGRAM
AVB-SH-01

SIZE	DWG. NO.	REV.
A	200163-001	B

SCALE NONE | SHEET 1 OF 1

REV	BY	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE :
DEC. XXX ± XX ±
DEG. ±

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FILE NO. EXTENSION
\PCA1\413002#.PCB

APPROVALS	DATE
DRAWN TA	081999
CHECKED JAE	091499
RELEASED	
SSF	

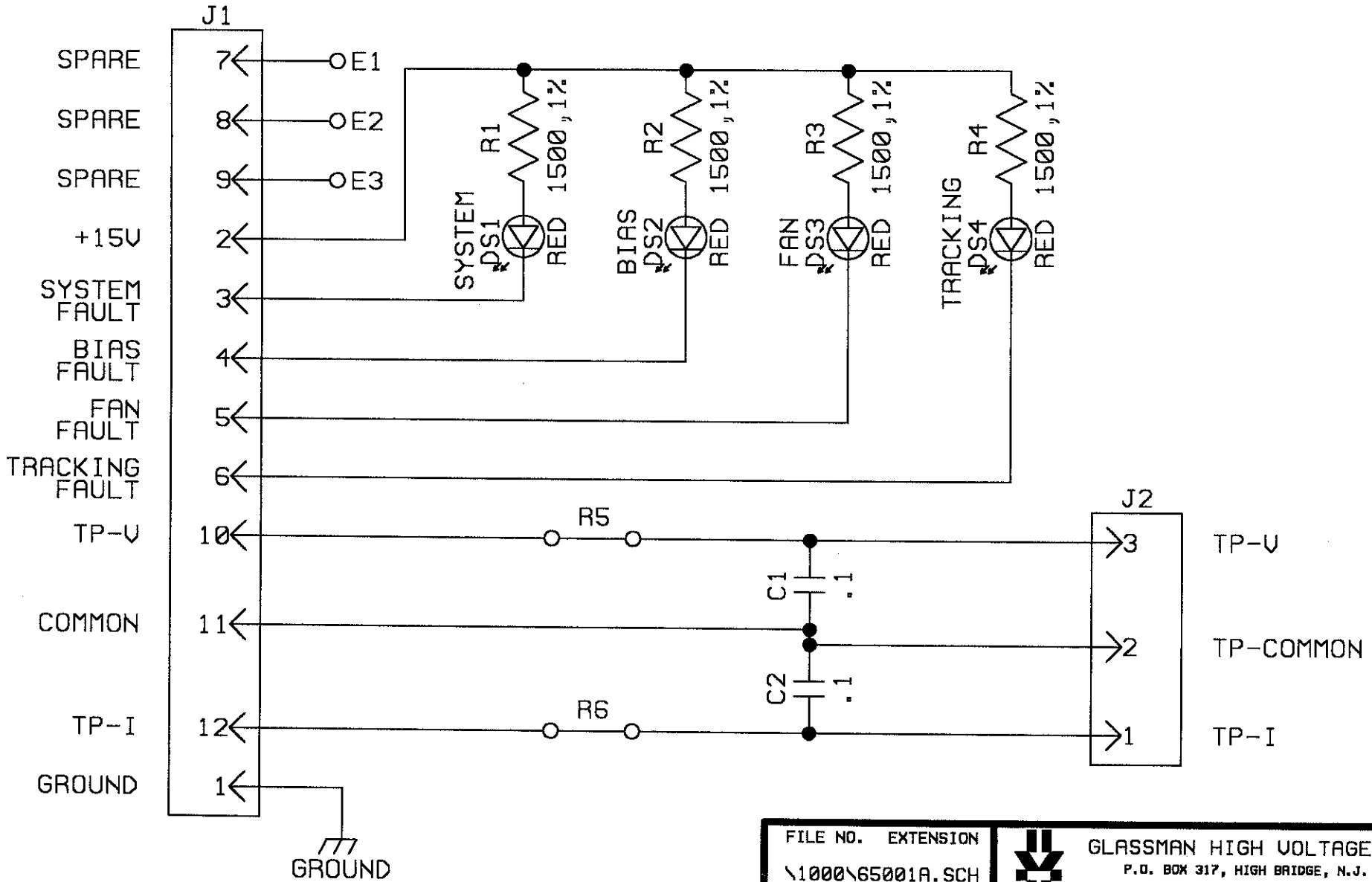
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889
(908) 534-9007 FAX (908)534-5672

TITLE PARTS PLACEMENT
ADS-SH

A | DWG. NO. PCA1413-002 | REV. NR

SCALE NONE | SHEET 1 OF 1

REV	BY	DESCRIPTION		APPROVED
A	JAG	ECN 8143: REMOVED R5 & R6.	101804	



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FILE NO. EXTENSION	
\1000\65001A.SCH	
APPROVAL	DATE
DRAWN TA	081999
CHECKED SD	091499
RELEASED	

GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, N.J. 08829
(908) 638-3800 FAX (908) 638-3700

TITLE: SCHEMATIC DIAGRAM
ADS-SH
SLAVE

A	DWG. NO. 100065-001	REV. A

SCALE NONE SHEET 1 OF 1

Glassman High Voltage, Inc.
Power Supply Test Data Sheet

Model PS/SH001R16.0 Serial No. N144732-01

I. Preliminary Mechanical Inspection ✓

II. Preliminary Electrical Check ✓

A. Reference Voltage 10.00 V

B. Maximum Output Voltage (No Load) +1.000 KV

C. Maximum Output Current 16,000 mA

D. Switching Frequency 40.0 KHz

E. Stability ✓

F. Dropout 180 VAC

III. Control Functions

A. Voltage Program Linearity 10.00 v = 1.00 kV; 1.00 v = .100 kV; 0v = 0 kV

B. ΔV: Voltage Program / Voltage Monitor 2.4 mV

C. Voltage Program Remote ✓

D. Current Program Linearity 10.00 v = 100.25%; 1.00 v = 9.87%; 0v = 0 %

E. ΔV: Current Program / Current Monitor 7.8 mV

F. Current Program Remote ✓

G. Interlock ✓ HV Enable ✓

H. KV Meter ✓ MA Meter ✓

IV.

Data	Line V	Line Current	B+	Output V	Output I		Ripple vp-p	
	VAC	IAC	VDC	KV	%	Total	Line freq.	RF
Full Load	208	56	280	1.00	95.2	1.4	0.9	0.5
No Load	208	6.0	295	1.00	0	0.48	0.28	0.20
Current Limit	208	52	280	.88	100.2	2.0	1.4	0.6
Short Circuit	208	8.4	295	0	100.4	0	0	0

V. Regulation: No Load – Full Load .18v ✓ Line 187 - 228 VAC <.005%

VI. Burn – In 4 Hours

Technician Terry Hoffenberg Date 2/15/2006